New Orleans Medical
and
Surgical Journal

Vol. 96 NOVEMBER, 1943 No. 5

PNEUMONIA IN THE ARMY*

LT. COL. E. V. ALLEN, M. C.†
and
CAPT. LESTER W. BAIRD, M. C.‡
CAMP CARSON, COLO.

For the past seven months, I have been engaged, as Medical Consultant for the Seventh Service Command, in visiting Station and General Hospitals at various military camps in nine mid-western states. As part of my assignment, I have had the privilege of seeing several thousands of patients with some hundreds of medical officers. The experience has been a gratifying one; and since I am enthusiastic about the quality of medical care in these hospitals, I am taking the opportunity of introducing my talk on "Pneumonia in the Army" with a few comments on the type of professional service which is given to soldiers. I am certain that you would be proud of the medical profession if you saw it in action in the Army; and I am equally certain that you would be gratified if you saw how well sick soldiers are cared for in the Army. Many of you have sons in the Army. More of you have friends whose sons are in the Army. It will gladden your hearts as it has gladdened mine to know that these boys are well cared for when they are sick. In fact, it is a conviction with me that sick soldiers in the Army are receiving, in general, better care than they received in civilian life. This conviction is adequately supported by mortality statistics. It is doubted that as small a percentage of patients in the Army with serious diseases as pneumonia and meningococcus meningitis, have died of these diseases in all the history of the world. I do not want to claim too much credit for medical officers in the Army, for the care by nurses, the use of sulfonamides, the comparative youth of the patients and their general good health, the early treatment—all these have been important in effecting the high percentage of recoveries. Nonetheless, the prompt and persistent care by young, well trained physicians who have acquired broad experience has been in the forefront of the various factors which have produced such excellent results.

Some of you may have been in station hospitals at Army camps. Perhaps you have been impressed or even depressed by the temporary structures which constitute hospital buildings in the Army. But a hospital is more than a building. In addition to that it is laboratory facilities, equipment, care by nurses and doctors, spirit and morale. When these are good, physical surroundings are of minor importance. Such is the situation in the Army. I would be flying in the face of good common sense if I represented medical practice in the Army as a state of perfection. At smaller station hospitals, even facilities and talent are sometimes deficient. To deny deficiencies would be to distort truth. My statements refer to the practice of medicine in general, in the Army. Nowhere has the valuable harvest of good medical education been more evident than it is in the Army today. Many of you have doubtless had some misgivings about the quality of med-

†Medical Consultant, Seventh Service Command.
‡Section on Roentgenology, Camp Carson, Colo.
*Delivered before the New Orleans Graduate Medical Assembly, New Orleans, March 15-18, 1943.

cal care in the Army which is now largely in the hands of professional associates in civilian life. They, 35,000 of them, have done and are doing a job which is a credit to the medical profession at large and a tribute to medical education in these United States. Your boy, your neighbor's boy and their Army associates are being cared for in an excellent manner when they are sick. Make no mistake about that, for, rumors and prejudices to the contrary, the quality of medical practice in the Army is on a very high level. Illustrative of this is the record relating to meningococcus meningitis. In four of the large station hospitals in the Seventh Service Command, there have been 132 cases of meningococcus meningitis with three deaths—a mortality rate of 2.3 per cent. That is an enviable record which is illustrative of good medical care in the Army.

CLASSIFICATION OF PNEUMONIA

Anyone who reads the literature on pneumonia will be confused by the terminology used. There is a great confusion of terms because the bacteriologist has one classification, the clinician another, the roentgenologist another, and the pathologist still another. Such terms as lobar, lobular, broncho, primary, metastatic, secondary, postoperative, typical, atypical, interstitial, influenzal, bacterial, virus, and pneumonitis perplex the uninitiated and expert alike. The commonly used designations typical and atypical are, of course, unsatisfactory, because, according to experience this year, what is called atypical pneumonia could be regarded as typical because it is the most common. This would make the typical pneumonia atypical this year. One could speak, therefore, of atypical typical or typical atypical pneumonia.[1] If this review of terms has confused you, your minds are in the same state as ours regarding this matter. Reimann has recently written that "nomenclature according to cause is the most desirable, that is, pneumococcus type I pneumonia, streptococcus hemolyticus psittacosis pneumonia, etc., and never minding whether it is clinically typical or not."[1] Unfortunately, the cause of many pneumonias is not known. Those interested primarily in pneumonia have done much to bring order out of this chaos as is well illustrated in Reimann's monograph on pneumonia.[2] Army medical authorities have presented a workable classification which clarifies the subject as far as pneumonia in the Army is concerned.

1. Primary Pneumonia: Pneumonia developing without relation to any coexisting disease, except that pneumonia developing in association with "common respiratory diseases." Examples: Pneumonia due to *bacteria* such as pneumococci, Friedlander's bacilli, staphylococci, and hemolytic streptococci. Additional example: Primary atypical pneumonia (so-called virus pneumonia).

2. Secondary Pneumonia: Pneumonia occurring in the course of other disease where it is a usual or frequent complication. Example: Pneumonia occurring in pertussis, measles, psittacosis, and tularemia.

In the Seventh Service Command, pneumonia due to rare causes, as psittacosis, brucellosis, tularemia and rickettsia, has not been observed recently as far as we have been informed. To our knowledge there has been one case of pneumonia due to coccidiomycosis, and a few due to Friedlander's bacilli, staphylococci and hemolytic streptococci.

The terms "influenza" and "infuenza pneumonia" have been confusing. Influenza must now be considered a specific disease caused by influenzal virus B.[1] It is predominantly a highly contagious disease of the respiratory tract with characteristic symptoms consisting of acute onset, generalized aching and hyperesthesia and usually associated with severe headache and marked prostration. Catarrhal symptoms are not marked; however, there is marked injection of the conjunctivae and nasopharynx, and leukopenia is characteristically present. The diagnosis can be made by isolating the virus by inoculation of ferrets, mice and eggs; and a diagnosis can be made in retrospect by the increase of the complement fixation titer for influenza antigen.

Strictly speaking, "influenzal pneumonia" is the pneumonia caused only by the viruses of influenza, a true viral pneumonia. In the 1918-19 epidemic, the influenza virus prepared the field for the invasion of the lungs by pneumococci, streptococci, staphylococci and Pfeiffer's bacilli (erroneously called "influenzal bacilli"). Fortunately, there has been no epidemic of influenzal pneumonia this year such as that which killed 19,249 of our Armed forces in the last war.[3] A few questionable isolated cases have been observed. Reimann believes that "influenzal pneumonia" will not occur this year because there is no evidence that viruses of influenza are widespread.[1]

This presentation is concerned chiefly with two pneumonias—that due to the pneumococcus and that presumably owing to a virus, the primary atypical pneumonia.

PNEUMOCOCCUS PNEUMONIA

All of you are familiar with classical pneumococcus pneumonia, the commonly designated lobar pneumonia. The subject with this kind of pneumonia is suddenly seized with a chill, with or without a previous history of a "cold". There are usually severe pleuritic pain, high fever, rusty sputum and findings on clinical examination which are easily interpreted. The number of white cells in the blood is greatly increased, there is polymorphonuclear leukocytosis and pneumococci can be recovered from the sputum. Roentgen examination shows dense, homogenous opacity which is frequently lobar in distribution. Response to adequate therapy with sulfathiazole or sulfadiazine is prompt. The body temperature becomes normal in about 48 hours if treatment is begun promptly. Roentgen signs usually disappear promptly. Such is the record reported in the following:

A soldier was admitted to the hospital the night of December 9, 1942. He had been well until approximately noon on December 9, as he had spent the morning on the obstacle course, and stated that he was able to do anything that he had been able to do previously. After lunch he began having fever and chills, with general body aching. There were a few moist rales in the upper lobe on physical examination, and his temperature was 104.8. The white blood cells numbered 26,350, and examination of the sputum showed type 7 pneumococcus. X-ray of the chest made December 11 showed dense, uniform consolidation of the right upper lobe (fig. 1). The patient was

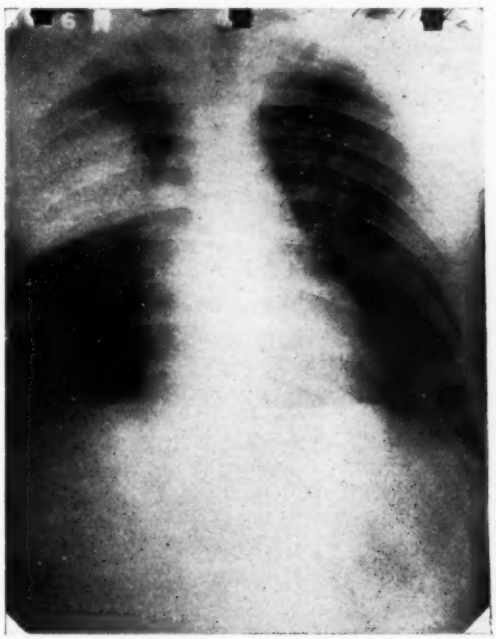

Fig. 1. Primary pneumonia, (pneumococcus type 7) right upper lobe.

given 2 grams of sulfathiazole and 1 gram of sulfadiazine every four hours. His temperature decreased to normal in 48 hours, and he made an uneventful recovery. X-ray films December 27 showed complete clearing of pneumonia and the lung fields entirely negative.

An instance of typical pneumococcus pneumonia is presented in the following. A soldier was admitted to the hospital because of cough and pain in the left chest of two to three days' duration. He was dyspneic but not acutely ill. Leukocytes numbered 13,200 and temperature was 102.2. Roentgen examination showed "infiltration in the left lower lobe with consolidation",

considered to be "lobar" pneumonia (fig. 2). Examination of the sputum showed type 7 pneumoncocci. Treatment with sulfathiazole was begun. His temperature became normal within 48 hours. Roentgen examination made four and eight days after the first one showed no change. Roentgen examination four days later showed beginning resolution and roentgen examination made 26 days after admission of the patient to the hospital showed slight fibrosis and pleural thickening.

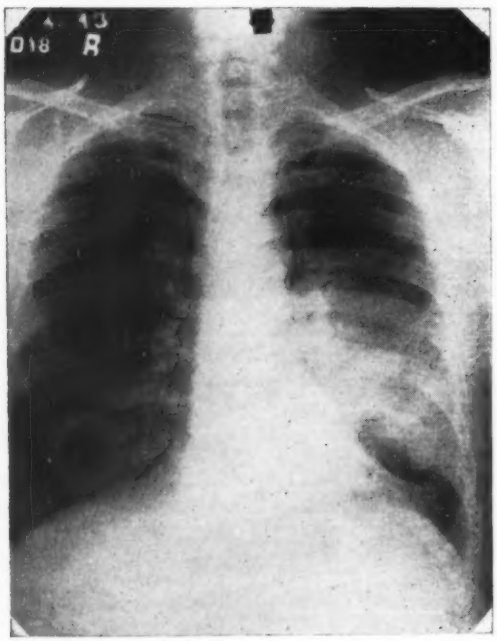

Fig. 2. Infiltration left lower lobe has roentgenologic characteristics of lobar type of pneumonia. Clinically this was a case of atypical pneumococcus pneumonia.

The diagnosis of pneumococcus pneumonia in this case may be questioned because of lack of acute onset, lack of marked leukocytosis and of high fever. However, type 7 pneumococci were found in the sputum, and since this type accounts for about 8 per cent of pneumococcus pneumonias, it should probably be considered pathogenic. Moreover, the x-ray films indicated "lobar" pneumonia to one experienced roentgenologist and response to sulfathiazole was prompt.

A qualified roentgenologist cannot always differentiate various kinds of pneumonia. Pneumococcus pneumonia may occasionally appear like virus pneumonia to him. The clinician cannot always reliably differentiate pneumococcus from virus pneumonia. In cases in which clinical history, physical findings, laboratory studies and roentgen survey fit closely into a pattern, there is no difficulty; but when one or more than one of these are discordant, the physician must remain uncertain. Many such cases have been observed in the Army. In such cases as these it has been impossible to classify pneumonia in a satisfactory manner.

The mortality from pneumococcus pneumonia has been very low in the Army. There have been only three deaths in 1,488 cases of pneumonia in three large station hospitals. All of these deaths were attributable to staphylococcus pneumonia. About one-third to one-half of the survivors had pneumococcus pneumonia. That is, roughly about 500-700 cases of pneumococcus pneumonia without a death. Of course, there are factors other than good medical care which are responsible for the remarkable recovery rate. Pneumonia is relatively mild in nature this year, the subjects are usually young adults who were previously well; and treatment is begun early, for soldiers are usually well enough for duty or they are admitted to the hospital.

PRIMARY ATYPICAL PNEUMONIA

This is a term applied to pneumonia which is primary and not bacterial in origin. It is commonly called virus pneumonia.

History: There has been a tendency to consider that this type of pneumonia has newly arrived upon the scene. It has definitely been known for seven years.[4, 5, 6] However, it was rare before 1938. Reimann believes it is not a new disease, but one which has been delineated from a large heterogenous group of pneumonias.[1] No one seems certain how long it has existed.

The recent increase in reported incidence of it seems owing to recognition of it as an entity and an actual increase in the incidence of it which represents a fluctuation in incidence common to many contagious diseases. The epidemic has probably reached its maximum at the present time.[1]

Etiology: The etiology of this type of pneumonia is unknown but it is probably caused by a virus. There is both indirect and direct evidence that this is true. The indirect evidence consists of: (1) contagiousness; (2) absence of bacterial cause; (3) failure to respond to therapy with sulfonamides. Direct evidence is furnished by search for virus. These studies are as yet inconclusive but highly suggestive. Viruses have been isolated from subjects with "atypical" pneumonia, which resemble the viruses of meningo-pneumonitis, psittacosis and lymphogranuloma venereum. A respiratory tract infection in cats has been shown to be due to a virus and a number of cases of humans who developed atypical pneumonia after contact with sick cats, have been reported. The virus seems to be the same or similar to that causing virus pneumonia of humans.[7] Material from such cases of human pneumonia, which is presumably a filtrable virus, produces pneumonia in rats. The studies suggest but do not prove that there is a causal relation between this agent and the most common form of "atypical pneumonia."[8] Additional studies suggest that it is closely related to the viruses which cause other diseases, as influenza, psittacosis, meningopneumonitis, lymphogranuloma inguinale and lymphocytic choriomeningitis.[9] Reimann and associates conclude their survey of the etiology of virus pneumonia with the following:

"From the facts at hand the adoption of the term "virus" pneumonia is justified, but only to indicate a syndrome composed of a group of entities, each caused by a specific filtrable virus, as for example, that of psittacosis and related infections, of influenza, of chickenpox, smallpox or of lymphocytic choriomeningitis or perhaps the mongoose-infecting virus. Furthermore, certain agents other than viruses, like the Rickettsia of "Q" fever, the protozoan Toxoplasma and the fungus Coccidioides immitis, may also cause disease resembling the pneumonias caused by viruses. And lastly there is a large group of atypical pneumonias of which the cause is still unknown. Therefore, etiologic studies should be made in all cases of pneumonia, including the special serologic tests for lymphocytic choriomeningitis and for disease caused by the psittacine group of viruses, and the disease named according to its etiologic agent whenever possible."

Clinical Manifestations: According to Dingle and associates, and in our own experience, atypical pneumonia is usually a disease syndrome characterized by gradual onset, mild or moderately severe illness in which constitutional symptoms predominate over respiratory symptoms in the early stages. Headache, fever, malaise and chilliness are observed in approximately 80 per cent of the patients. A dry and paroxysmal cough is present early in the disease, and is productive of non-bloody sputum at the time of admission in about two-thirds of the patients. Chest pain is more frequently substernal than pleural. Coryza, sore throat and gastrointestinal symptoms are less commonly observed. Variants from these clinical manifestations are common.

Prostration is rarely observed. The fever is intermittent in type, rarely sustained and usually persists for two to six days in the majority of the patients. The pulse and respiratory rates are relatively low. Signs of involvement of the upper respiratory passages may be noted in a small percentage of the cases. Relatively few abnormal signs in the lungs are detected in proportion to the degree of pulmonary involvement shown radiographically. The most characteristic sign is the subcrepitant "sticky" rale best elicited after coughing and deep breathing. Rhonchi may be detected in approximately 40 per cent of patients. Changes in percussion and breath sounds are rarely observed.

The roentgenographic lesion in many patients is characteristic. The early lesion is usually at the hilus and is observed to

spread in a wedge or fan-shape to the periphery of the lung. Spread may occur within a lobe or to an adjoining lobe. A common site of the lesion may be the cardiophrenic angle. The infiltration is usually soft and either patchy or homogeneous. Rarely is the shadow as dense as that observed in pneumococcus pneumonia. Diffuse seeding of such an extent as to resemble miliary tuberculosis has been noted occasionally. Resolution of the pulmonary shadow commonly occurs within a few days. Experience has taught that there are no "characteristic" roentgen evidences of "virus" pneumonia or of bacterial pneumonia. An abnormal accumulation of pleural fluid is rarely noted. The distribution of the pulmonary lesions shown radiographically resembles that found in pneumococcal pneumonia, namely, the more frequent involvement of the lower lobes.

The clinical course of atypical pneumonia may vary considerably. Although mild infections are most frequently observed, severe infections may be noted. In addition, some patients may have roentgenographic evidence of pneumonia without clinical evidence of the disease. The duration of acute illness of atypical pneumonia may vary between two days and 45 days. The white blood cell count in atypical pneumonia, both during the febrile and afebrile periods, varies between 6,000 and 10,000 in the majority of patients. Differential counts likewise show no significant abnormalities. Bacteriologic examination of specimens of sputum, throat and blood have thus far shown no organism which, by reason of its occurrence or predominance, can be considered to be a specific etiologic agent.

Complications occurring during the course of atypical pneumonia are infrequent. The prognosis is excellent. The disease is rarely serious, but death may result from the disease itself, from secondary bacterial invasion or from the infection superimposed upon pre-existing organic disease.

Differential Diagnosis: Characteristic instances of virus pneumonia need not be confused with other conditions, particularly when there are epidemics. One need always think of tularemia, psittacosis, meningopneumonitis, and brucellosis. The bacterial pneumonias may closely simulate virus pneumonias; we have observed instances of atypical pneumococcus pneumonia which closely resembled virus pneumonia as to onset, fever, roentgen manifestations and number of leukocytes in the blood. However, pneumococci considered pathogenic were found in the sputum and the disease responded promptly to sulfathiazole. In many cases it is impossible to make an exact diagnosis based on etiology. This statement necessitates discussion of when and why not to use one of the sulfonamides. Some medical officers urge the use of sulfathiazole or sulfadiazine for 48 hours at least in every case of pneumonia. Others disagree heartily. In the Army, some medical officers follow one plan, some follow another. If the clinical history and physical findings are characteristic of virus pneumonia in a specific case, and if the patient is not seriously ill, it is justifiable to withhold chemotherapy until studies of sputum and roentgen examination confirm or deny the diagnosis. When doubt exists or when laboratory and roentgen facilities are not available, a patient with pneumonia should be treated with sulfathiazole or sulfadiazine in our estimation. Treatment should be continued until the efficacy or lack of efficacy of such treatment has been established. Certainly, a patient who is admitted to a hospital seriously ill with pneumonia should not be denied the possible benefit of drugs, until cautious study can be made to determine whether or not he has virus pneumonia. The same policy is advisable here as that followed in frank pneumococcus pneumonia. The alert physician waits neither for reports on sputum nor the results of roentgen examination. He treats the patient first and gets the reports later.

Treatment: In most cases no specific treatment is necessary. Irrigation of the throat, inhalation of medicated steam, instillations into the nose of ephedrine or re-

lated compounds, and use of expectorants or drugs to control cough may relieve symptoms for which they are prescribed. Contrary to common opinion it has been our observation that "sulfa" drugs seem to cause reduction of fever occasionally. Unfortunately one cannot determine whether or not fever would not have decreased without specific treatment. Inhalation of oxygen should be used when significant cyanosis occurs. Some seriously ill individuals improve in a dramatic manner following the intravenous injection of blood plasma.

Incidence: This is a very common type of pneumonia in the Army; and usually comprises 50 to 80 per cent of all the pneumonia.

Mortality: According to information which we have, no deaths have occurred from virus pneumonia in the Seventh Service Command.

ILLUSTRATIVE CASES

CASE No. 1

A soldier was admitted to the station hospital because of sore throat, pain in an ear, fever, blood streaked sputum and generalized weakness. His temperature was 101.6° and leukocytes numbered 7500. Roentgen examination showed evidence of two small areas of infiltration in the right upper and middle lobes. Sulfathiazole was given beginning two hours after admission, when the temperature was 103° F. The temperature was normal within 48 hours. Roentgen examination seven days after examination was negative.

Comment: This is a characteristic example of mild virus pneumonia. One cannot attribute the sharp disappearance of fever to the use of sulfathiazole, for fever frequently disappears as rapidly without chemotherapy. Nonetheless, the disappearance of fever occurs so commonly during treatment with sulfathiazole that one cannot deny entirely an effect of the drug.

CASE No. 2

A patient was admitted to the hospital because of generalized aching, chills, and cough. Physical examination disclosed suppression of breath sounds and rales at the right base. The temperature was 101.4° F., the leukocytes numbered 11,400 and pneumococci could not be found in the sputum. Roentgen examination showed infiltration in the right cardio-phrenic angle. The temperature became normal on the third hospital day. Roentgen examination four days after admission was negative.

Comment: This is likewise a characteristic example of mild virus pneumonia. Recovery occurred as quickly in this case as it did in the previous case in which chemotherapy was used. This emphasizes the need for caution in interpreting results of treatment of pneumonia with drugs.

CASE No. 3

A soldier was admitted to the hospital because of a cold he had had for two weeks. His temperature was 102.6°. A few fine rales were found at the right base on physical examination. Roentgen examination showed patchy involvement of the right lower lobe. His temperature became normal in four days without specific treatment and roentgen examination six days after admission was negative.

Comment: This is likewise a characteristic example of mild virus pneumonia. The recovery without chemotherapy is characteristic.

CASE No. 4

A patient was admitted to the hospital because of a cold and generalized aching and fever of 101.4°. The leukocytes numbered 15,800. Roentgen examination showed pneumonia of the right middle lobe (fig. 3). No pneumococci could be re-

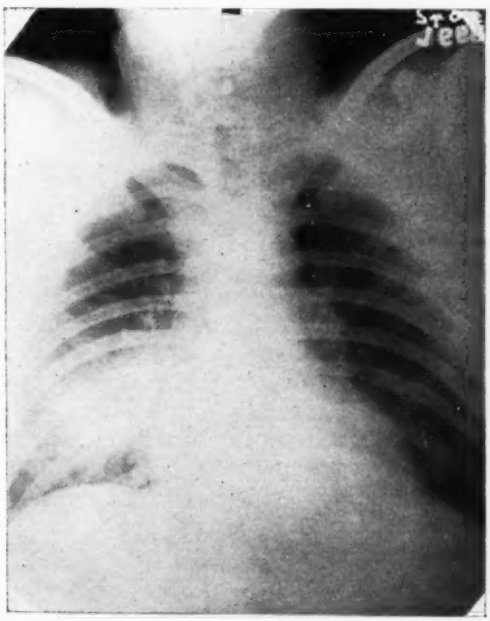

Fig. 3. Primary atypical pneumonia right middle lobe resembling lobar type roentgenologically.

covered from the sputum. The patient's temperature became normal on the fifth day. Roentgen examination ten days after admission was negative.

Comment: This is a characteristic example of primary atypical pneumonia, except that the leucocyte count was high.

CASE No. 5

A soldier was admitted to the hospital because of a "cold" of four days' duration. His temperature on admission was 101.2° and roentgen examination showed infiltration and consolidation involving the left lower lobe. Pneumococci could not be found in the sputum. Treatment with sulfathiazole was begun and the temperature became normal on the third day. On the fifth day the patient had a chill and sulfadiazine was substituted for sulfathiazole. Roentgen examination showed the pneumonia in the left lower lobe had cleared but that there was infiltration in the left upper lobe. The temperature became normal in 48 hours. Roentgen examination 22 days after the chill was normal.

Comment: This is a good example of pneumonia occasionally designated by the adjective "migratory" because it disappears in a part of a lung and simultaneously occurs in another part. This is not an uncommon variety of "virus" pneumonia. It is worthy of comment that involvement of the upper lobe occurred during the treatment with sulfathiazole; conclusive evidence of ineffectiveness in this particular case.

SUMMARY

We have observed cases of diffuse involvement of both lungs with patchy pneumonitis. Such cases are fortunately rare; the patients are almost always seriously ill with fever, dyspnea, cyanosis and prostration. On auscultation, one hears rhonchi not unlike those heard in chronic asthmatic bronchitis and finer rales. Also we have observed cases showing persistence of roentgen findings in the lungs which have persisted essentially unchanged for several weeks after the patients have recovered.

REFERENCES

1. Reimann, Hobart, A.: Personal communication.

2. Reimann, Hobart A.: The Pneumonias, W. B. Saunders Co., Philadelphia, 1938.

3. Norris, George W., and Landis, H. R. M.: Diseases of the Chest and the Principles of Physical Diagnosis, W. B. Saunders Co., Philadelphia, 1940.

4. Reimann, Hobart A., and Havens, W. Paul, and Price, A. H.: Etiology of atypical "virus" pneumonias with a brief resume of recent discoveries, Arch. Int. Med., 70: 513, 1942.

5. Primary atypical pneumonia; etiology unknown, The Army Medical Bulletin, 61:31, 1942.

6. Duggan, L. R., and Powers, W. L.: Respiratory infection resembling so-called acute meningitis, J. Lab. & Clin. Med., 28:524, 1943.

7. Baker, James A.: A virus obtained from a pneumonia of cats and its possible relation to the cause of atypical pneumonia in man, Science, 96:475, 1942.

8. Eaton, M. D., Meikeljohn, Gordon, Van Herick, W. M., and Talbot, J. C.: An infectious agent from cases of atypical pneumonia apparently transmitted to cotton rats, Science, 96:518, 1942.

9. Beck, Dorothy, and Eaton, Monroe D.: Identification of two strains of virus isolated from cases of atypical pneumonia, J. Infect. Dis., 71:97, 1942.

10. Dingle, John H., Abernathy, Theodore J., Badger, George F., Buddingh, G. John, Feller, A. E., Langmeier, Alexander D., Ruegsegger, James M., and Wood, W. Barry, Primary atypical pneumonia, etiology unknown, War Med., 3:223, 1943.

SYLVATIC PLAGUE*

PROBABLE ORIGIN IN THE UNITED STATES, DISTRIBUTION, POTENTIALITIES AS A RESERVOIR FOR INFECTIONS IN MAN

SAM A. TRUFANT, III, M. D.
NEW ORLEANS

INTRODUCTION AND HISTORICAL REVIEW

In 1894 an epidemic occurred which brought Kitasato and Yersin from the laboratories of Koch and Pasteur halfway round the globe to study it; plague was in Hong Kong. Independently they isolated and described *Pasteurella* pestis as the guilty organism, but the infection was on its way around the world. In its spread to the Western world it arrived in Hawaii in 1899 and on March 6, 1900, in the Chinese quarter of San Francisco the diagnosis was proved by bacteriological and cultural examination of a dead Chinese. By the end of December, 21 more patients were dead of plague in San Francisco.

The Governor refused to admit the possibility. The newspapers and business interests denied it as impossible—but *P. pestis* went its merry way and it was not until mid-February 1901 that the Governor turned the matter over to the U. S. Marine Hospital Service (now the United States Public Health Service). Despite this, in

*Thesis awarded Walter Reed Memorial Prize of the Louisiana State Medical Society, 1943.

1901 of 30 cases reported 25 died. City, State and Federal officials viewed with alarm and redoubled their efforts to stop the epidemic. Rat proofing, rat poisoning, fumigation of buildings and ships, house to house canvasses to assure adequate safeguarding against the disease were carried on. Sermons were preached. Bounties were paid for rat corpses and rat eradication was taught in the schools. But in 1902, 38 cases were reported in San Francisco, one each across the bay in Oakland and Berkeley and one in Davisville, 41, all fatal. Plague had spread beyond San Francisco.

In 1903 only San Francisco was victimized with 17 cases, and in 1904 only 10. But all in all 120 cases from 1900 to 1904 had cost 114 lives. San Francisco had a breathing spell with no cases in 1905 and 1906. Vigilance was relaxed and in 1906 it was not surprising that, following the earthquake, even less attention was paid the problem. Neglect, however, as always, collected its due in 1907 in the form of 178 cases with 87 deaths, 16 of which were in Oakland and one each in Berkeley and Pt. Richmond. Three cases were also reported in Seattle with three deaths. A second major focus had been set up. But another "epidemic" had meantime taken place. In 1903 great numbers of ground squirrels were reported to have died in the area around San Francisco Bay. It was in 1903 while investigating the origin of a fatal case of plague in a blacksmith in Contra Costa County on the East side of San Francisco Bay that Rupert Blue became impressed with the possibility, that ground squirrels might be infected. The patient had shot ground squirrels three or four days before the onset of illness. One month later bubonic plague was proved in a railroad man who had stayed at a construction camp where ground squirrels were killed and eaten. Early in 1904 another fatal plague infection was recognized in another sector of the county and Meyer refers to a case in 1906, a boy who had shot ground squirrels in Strawberry Canyon on the grounds of the University of California, sickened with typical bubonic plague (though this case seemed real no cases are listed in the U. S. P. H. S. Reports for 1906). Inquiries made by Long and Wherry disclosed that in Contra Costa County between 1933 and 1905 the ground or "digger" squirrel (*Citellus beecheyi*) had been decimated in various localities by sickness and deaths. Despite every inducement, it was impossible to secure a sick or dead animal. However, Currie had in 1904 ascertained the susceptibility of the ground squirrel to plague infection by inoculation and direct contact. But not until 1908 when, following the recognition of two fatal rural plague cases (a boy at Concord and a man at Briones Valley), a special trapping crew under Long collected 423 ground squirrels on a ranch outside Concord, was proof obtained that the cause of the mass mortality was *P. pestis*. Finally in 1909, McCoy and Wherry performed the first postmortem on a boy who had been out squirrel hunting five days prior to his becoming ill. While on this shooting trip he had shot four or five squirrels which he had brought home with him (it was subsequently proved that there were plague infected ground squirrels in the immediate vicinity of where the boy had been hunting). There was no evidence that he had been in any place where he might have become infected with plague except on this hunting trip. The autopsy proved plague as the cause of death and at the same time proved that plague in man could be transmitted from the ground squirrels. Sylvatic plague was established.

It might be interesting to note here the origin of the term "sylvatic plague." Jorge proposed the term "peste selvatique" in 1928. Until 1934 it was referred to as such in English, but subsequent etymologic studies showed that sylvatic means running or growing wild in reference to animals and the spelling sylvatic was adopted. Some men feel that the term should be discarded since it tends to create a false sense of security.

ORIGIN IN THE UNITED STATES

Once that its existence was proved the question naturally arose, "From whence did it come?"

For many years it seemed certain the origin of the disease was from rats which were transported to San Francisco on ships (and indeed it is still undoubted that plague came to various places by ship), but extensive and careful epidemiologic studies were not made for a great many years and only recently has the evidence been critically reviewed and doubt as to this method of origin arisen. Meyer has recently raised the question as to the possibility of plague being indigenous in the Western world rodents as it is in their Asiatic cousins and possibly their South African cousins in much the same way that yellow fever is indigenous in South America and Central Africa.

THE "IMPORTATION" THEORY

By virtue of its seniority the importation theory of the origin will be discussed first. At first glance it seems obvious that ships arriving at San Francisco from Hong Kong carrying infected rats requires little further study as the origin of plague in the United States; quite probably this was the way in which the human cases arose. Furthermore factors influential in directing plague toward the United States and then aiding in its maintenance merit attention. These factors are: (1) the arrival and spread of the rat in the United States; (2) the presence in San Francisco and other cities of conditions suitable for rat propagation; (3) the presence of infected rats; (4) the maintenance of the reservoir of infected rats; (5) commerce and shipping with rat-infested and plague infected ports; (6) the destruction of the rats' natural enemies; (7) the human toleration of the rat; (8) the spread of plague to other rodents and the maintenance of the reservoir in other rodents; and (9) popular misconceptions.

Rats have long been known as a repository for plague and due to their widespread distribution their arrival and spread in the United States is of importance. Chronologically, at least, the rat was the first affected rodent. Infection of other rodents followed. Furthermore, it would seem that had San Francisco been rat free in 1900 it would have at least hampered the development of human cases. Boelter tells us that the brown rat first came to this country in 1735 on English ships to the eastern seaboard, and in 1740 to New Orleans. He believes also that they did not move rapidly westward until 1825 when they had reached Missouri, but in 1880 they were in San Francisco. However, it would seem that his dates are guesses and that with the gold rush of 1849 rats must have come to San Francisco on ships along with the hordes of men.

Whatever the origin, San Francisco had rats in 1900 and what is more, conditions for the propagation of rats were present as everywhere. The buildings were wooden and few were ratproofed. Even sidewalks were of board in many areas. Also San Francisco was a seaport, the sewage was hardly modern and garbage disposal was none too vigorous. That there were infected rats in San Francisco before human cases is now generally accepted, though the rat infection was not proved until 1902.

After the reservoir in rats was established it was easy to maintain for two reasons: (1) the close association of rat with rat in crowded burrows thus allowing ready interchange of fleas from rat to rat, and (2) rats have a habit of being inaccessible if they wish to be. These factors make for great difficulty in stamping out the infection. What with the vigor the search for infected rats relaxed in 1905 and 1906 due to the absence of human morbidity, failure to find such rats does not prove that there were none or that the epidemic of 1907 and 1908 was from the outside. To say that San Francisco was not in commercial and shipping touch with rat-infested and plague-infected ports is fantastic on its face, for plague was widespread in the ports of the world. No port is entirely rat-free and in 1900 it is hardly conceivable that rigid measures were taken to prevent rats from boarding a ship in one port and leaving it in another. Furthermore, even with restrictions on shipping from plague infected ports one need not rule out the possibility of such ports or rather their rats, transmitting the infection. Prime example

is that it was over a year before San Francisco was admitted to be plague infected and meantime its rats spread to the ports of the world.

At least in so far as rat-borne disease was concerned, an unfortunate incident was the destruction of the rats' natural enemies by farmers especially—snakes, owls, foxes, hawks and many others. This permitted, among other things, the spread of the rat from urban centers to the country regions where the wild rodents abound.

No less important is the fact that man tolerates the rat. Of course until the beginning of the 20th century little or nothing was known of the role of the rat in Public Health, so that one can better understand its being tolerated. Since its relation to disease has been appreciated, the number of diseases in which it has proved to play a role is indeed staggering. Yet with this knowledge at hand only little concerted and vigorous effort has been spent in exterminating this harborer of disease, and the rat continues its more or less peaceful and prosaic existence. And in this prosaic existence, with many of its natural enemies removed from its sphere by man, the rat ventures into the wooded areas and finds the burrows of its cousins—the ground squirrel (not to mention the other species of rodents that are now known to harbor the infection) with whom he exchanges fleas, and we have wild rodent plague. The size of this reservoir is incalculable, not only as regards plague but as regards the other rodent borne infections of man.

Furthermore, this vast reservoir of wild rodents once set up is literally self-perpetuating, and if rat plague was difficult to stamp out in San Francisco alone, the business of getting rid of the infection in wild rodents of the forests and plains is well nigh insurmountable. It is hardly to be expected that such a reservoir will pass naturally out of existence, for plague is believed to have originated in outer Mongolia centuries ago in wild rodents and it is still there.

Adding to the ease of the spread and maintenance are several thoroughly disproved but popular misconceptions. Plague is believed by the laity to be a disease of filth—this is true only in so far as filth provides food and shelter for rats and rat fleas, personal cleanliness alone is no prophylactic. That plague is a disease of Orientals since it is in the Orient that it has been going on for years—but only in Chinatown was there no plague in 1907-1908 for it has been "built-out", plague is no respector of age, sex, or race. Neither is plague confined to seaports or tropics—it is only that these areas with their wooden wharves and buildings provide a more favorable environment for the rats.

ENZOOTIC THEORY

The above evidence would seem ample to support the contention that plague was imported into the United States by ships and that it then spread to wild rodents. Nevertheless, Meyer particularly, questions that belief and propounds the idea that perhaps plague infection is enzootic in the Western United States, as it is in Asia and probably the steppes of Russia and in South Africa. There are several questions of vast importance which the importation theory fails to answer adequately. These questions have largely to do with ecology of plague. Unfortunately, it is only in the past few years that extensive studies on the problem have been carried out in this country, though the ground for such work was broken by ecological investigations of McCoy, Wherry, Blue and others at the time of the first outbreaks. There have been, however, many studies on the problem in other countries.

ECOLOGICAL "FACTS"

Since this problem deals largely with the ecology of sylvatic plague it is proper that we should set forth just what facts are definitely known and then consider the evidence bearing on the missing information.

It is known that plague in wild rodents exists in twelve of the western states, at least, and that this extends inland for over 1200 miles, beyond the Great Divide into North Dakota, Wyoming and New Mexico.

Localized epizootics among wild rodents occur and occur usually in the early spring. Despite "control" measures these epizootics continue with a cyclic mortality for periods of over three years. What is perhaps even more important is that these epizootics occur in the same site from time to time. These facts have been extensively studied on the J. D. Ranch near Hollister, California, where in 1910 an infected squirrel was shot, but no systematic search was made for plague until 1928 and 1929 when a visible rodent mortality was proved to be due to *P. pestis*, and although suppressive measures were continuously carried out infected fleas were still present in 1938. There are several other reports of a similar nature in the Public Health Reports. Fourie states that similar periodic epizootics are seen in South Africa, and they are also seen in southeastern Russia. Meyer and Eddie finally proved, in view of this periodicity, the persistence of rodent plague in a focus once set up, when they found that the same burrows that were known to have been infected in 1916 to be infected in 1936.

We also know that a vector is substantially indispensable to complete the propagation of plague among wild rodents. This was established as early as 1910 by McCoy in this country for the ground squirrel, the vector being the flea (*Diamanus montanus*). This flea not only harbored *P. pestis* but also conveyed it from squirrel to squirrel. This work has been duplicated many times for over 13 species of flea in North America by Eskey and Haas, and by others in Russia and South Africa. These fleas are known to be capable of transmission of the infection after several months of "storage" and starvation. Very low temperature seems to increase the period of infectivity.

So far spontaneous infections or reservoirs of plague have been established in over 31 rodents and in rabbits, the former including ground squirrels, marmots, chipmunks, wood rats, kangaroo rats and prairie dogs. Other rodents have been found naturally infected in Russia, Mongolia and South Africa.

It is known that the plague bacilli responsible for these epizootics are biologically identical with those causing plague in rats and man both in the United States and other parts of the world. Recently however, Kurauchi has divided plague organisms into two groups, Alpha (non-glycerin-fermenting) and Beta (glycerin-fermenting). The latter are endemic in the islands and peninsulas and the tropics (India, Ceylon, Japan, Java) while the former are endemic in the Asiatic plateau, Mongolia, and Manchuria. He contends that since the California organisms are Beta as were those in Hong Kong in 1894 that the enzootic race in North America is descended from them. Unfortunately, the organisms east of the Rocky Mountains have not yet been so studied and also the organisms of South African plague, which is believed to have originated in Hong Kong, are of the Alpha group. Further studies are needed to give weight to this evidence for the origin of sylvatic plague in the United States.

The one final thing from an epidemiologic point that is known is that sylvatic plague can be transmitted from wild rodents to man. There is ample evidence for this in the U. S. P. H. S. Reports and in writings of McCoy and Meyer. The disease differs in no way from that transmitted by rats and the anatomical lesions are similar.

It may seem to the reader that I have gone astray, but only by considering what is known of the ecology of sylvatic plague can we appreciate the gaps in our knowledge that will have been opened by a careful perusal of foregoing paragraphs.

UNSOLVED PROBLEMS

Since most of the above facts could be explained by the importation theory of origin it is well to consider other questions. Meyer mentions a report by S. S. Wilson of an epizootic among Townsend squirrels in Washington in 1896, an area now proved to be plague infected. Also he states that old residents of California had noted rodent epizootics many years before the San Francisco epidemic and states that they would not handle the victims of these

epizootics. It would seem that some consideration must be given these facts involving the problems of the mechanism of spread and perpetuation.

SPREAD

Inquiries into the mechanism of the spread of plague to inland United States are of recent date and they tend to cast doubt on the importation theory. For after all, plague is many hundred miles from its point of "origin" and the epizootics of the past few years have occurred in widely scattered areas. In the solution of this problem studies on the flea are of most importance and are not yet complete. Only recently Jellison and Wheeler have shown that the same fleas that carry plague are found on the burrowing owls that share the colonies of the ground squirrels. To date it would seem, however, that the main spread is by contiguity as there is no evidence for spectacular migrations and studies on the life habits of the ground squirrels by Evans and Holdenried show that the squirrel population moves very slowly from its birthplace. The studies by Jellison in this country and Ergorov in Russia show that the disease bearing cadavers and fleas may be transmitted by predatory birds for considerable distances, however, the evidence is as yet incomplete and further studies are required to determine the efficiency of such transmission. Finally, it is suggested that infected rodents may be transported by railroads though no studies have been specifically made. The question therefore resolves itself as to whether or not the natural transmission of the organism could cover 1200 or more miles over mountains in 40 years. Until further ecological studies are carried out the question is unanswered. These studies must include not only fleas, rodents, and scavengers, but the effects of climate and atmospheric conditions on *P. pestis*.

PERPETUATION

It is known that plague, once established in a wild rodent population persists but what the mechanism is has not yet been demonstrated. There are certain experimental data from work done originally in Russia and South Africa, much of which lately has been confirmed in the United States. This work shows that dead carcasses are soon removed by predators and even if not removed are infective for only a short time even though they die in burrows (death in burrows is not usual so that the carcasses are rapidly removed by predators). In frozen cadavers the infectivity may last up to six months but little of the area of plague in this country experiences frozen ground. Though Eskey has shown that dried feces may be infective for five weeks there is no evidence to show that rodents become infected by this means. In so far as California is concerned, Meyer contends the squirrels of the lowlands preserve the infection by subacute cases in young adults. In the lowlands hibernation is not an important factor. However, in certain areas hibernation is of importance as the rodents may hibernate for as much as seven months. Since there is no satisfactory evidence that the soil of the burrows is infective, experimental investigations have suggested two other possibilities: (1) a latent form that persists during hibernation, and (2) that fleas may remain infective for long periods. The latent plague in rodents is not a chronic form but rather appears to be a variety of *P. pestis* infections without marked or characteristic anatomic lesions and associated with organisms of low virulence. This latent form is reactivated, but the adequate stimulus for reactivation is as yet unknown. Malnutrition, gestation and environmental factors have been suggested. There is little evidence to support this concept, though the studies are meager. As to the second idea, that fleas carry over the infection from season to season the evidence is more convincing. Experimentally, infected fleas have been found to be infective, after starvation and freezing for periods up to five months (Eskey and Haas). However the work in the laboratory has not yet been checked in the field and, until such a time as it is so checked, remains speculation as to its role in perpetuation of the infection. The ob-

servations of Pirie in South Africa showed that: (a) in the absence of fleas, plague was not persistent in gerbille burrows for even one month, but (b) with fleas present it persisted up to four months. These experiments have yet to be checked in the United States.

Brief consideration must be given to the possibility that non-hibernating rodents such as mice and rabbits may carry *P.*

TABLE 1

DISTRIBUTION BY STATES SHOWING INFECTED RODENTS AND ARTHROPODS

State	Rodent (date first found)	Arthropod (date first found)
Arizona		Fleas from prairie dogs (1938)
California	Rat (1900) Ground squirrels (1908) Wood rat (1909) Field mouse (1935) Chipmunk (1936) Flying squirrels (1937) Rabbit (1942)	Fleas from ground squirrels (1936) Fleas from chipmunks (1937) Fleas from ground squirrels (1937) Lice from ground squirrels (1937) Ticks from ground squirrels (1937)
Colorado	Ground squirrels (1941) Marmot (1941)	Fleas from marmots (1941)
Florida	Rats (1920)	
Idaho	Ground squirrels (1936)	Fleas from ground squirrels (1930) Tick from ground squirrels (1937) Lice from ground squirrels (1938) Fleas from marmot (1938)
Louisiana	Rats (1912) Mouse (1915)	
Montana	Ground squirrels (1935) Marmots (1936)	Fleas from marmots (1936) Lice from marmots (1936) Fleas from ground squirrels (1938)
Nevada	Ground squirrels (1940)	Fleas from marmot (1936) Fleas from chipmunks (1937) Lice from ground squirrels (1937) Fleas from wood rats (1938)
New Mexico	Prairie dogs (1938) Kangaroo rat (1939) Rock squirrels (1941) White footed mouse (1941)	Fleas from prairie dogs (1938) Fleas from field mice (1938) Fleas from ground squirrels (1938)
North Dakota		Fleas from ground squirrels (1941)
Oregon	Ground squirrels (1935) Marmot (1940)	Fleas from ground squirrels (1937) Lice from ground squirrels (1938) Tick from ground squirrels (1938)
Texas	Rats (1920)	
Utah	Ground squirrels (1936) Marmot (1936) Prairie dogs (1936)	Fleas from marmot (1936) Fleas from prairie dog (1937) Lice from ground squirrels (1937) Fleas from ground squirrels (1937)
Washington	Rats (1907) Ground squirrels (1938) Cotton tail rabbits (1939)	Fleas from ground squirrels (1937) Lice from ground squirrels (1937) Fleas from rabbit (1940) Fleas from rats (1942) Lice from rats (1942)
Wyoming	Ground squirrels (1938) Marmot (1940)	Fleas Lice from ground squirrels (1938) Ticks from ground squirrels (1938) Fleas from prairie dog (1938)

pestis in their organs during the winter even though there is little published evidence as to its value.

I have tried to show by ecologic evidence that, while there are many facts at hand we have little idea as to the mode of production of those facts and that until such are known the problem of the origin of sylvatic plague is largely in the realm of speculation. Certainly the origin is as yet undetermined.

DISTRIBUTION

The factors responsible for the distribution of sylvatic plague have been discussed above and need not be mentioned further. Suffice it to say that infected wild rodents are known to exist in the following states: Washington, Oregon, California, Idaho, Nevada, Colorado, Arizona, New Mexico, Montana, Wyoming, Utah and North Dakota.

Table 1 shows the states in which plague infected rodents and arthropods have been found, and it is interesting to note that in each area wherever found the condition has persisted. The exceptions to this are Louisiana, Florida and Texas where studies have not been extensively followed up in recent years and murine plague only has been observed.

Table 2 shows the species of rodents in the United States known to be infected through 1942.

Table 3 shows fleas known to be of importance in transmission of the infection, *X. cheopis* of rats being proved infective for man. The lice and ticks included have been found to be infected and possibly play a role in maintaining plague in wild rodents.

Table 4 shows human cases reported through 1942 distributed by states.

A comparison of surveyed areas shows that in nearly all instances infected mammals or arthropods have been found. If not in all areas, at least in areas not far distant. Thus it would seem that the unexamined areas should be surveyed as soon as possible.

Considering the present upset domestic conditions due to war it will no doubt be some time before any definite statement can be made concerning the distribution of sylvatic plague. A casual glance at the maps shows some correlation with mountainous districts (suggestive of the distribution of the other foci in the steppe areas of Russia, Mongolia and South Africa). Nevertheless, this is an important phase of the problem,

TABLE 2*

PLAGUE-INFECTED RODENTS AND LAGOMORPHA

Order *Rodentia*	
Family Ciuridae	Family Circetidae
Genus *Citellus* (ground squirrels)	Genus *Urotomas* (native wood rat)
beecheyi beecheyi	cinera occidentalis
beecheyi fisheri	fuscipes mohavensis
beldingi oregonus	lepida intermedia
columbian columbianus	lepida lepida
columbian raficandus	
saterals chrysodeirus	Genus *Peromyseus*
leuceruus	truei gilberti
richardsonii elegans	truei truei
richardsonii nevadensis	
richardsonii richardsoni	
variegatus grammurus	
variegatus utah	
washingtoni loringi	
washingtoni washingtoni	
Genus *Tamiasciurus* (tree squirrels)	
douglasii albolimbatus	
Genus *Glauconnys* (flying squirrels)	
sabririus lascivrous	
Genus *Cynomys* (Prairie dogs)	
gunnisoni zuniensis	
leucurus	
parvidens	
Genus Entarmias (chipmunk)	
quadrivitatus frater	
Genus Marmota (marmot, woodchuck, ground hog)	
flaviventis engelhardti	
flaviventis nosophora	
Family Muridae	Family Heteomydae
Genus *Rattus* (rats)	Genus *Dipodmys* (kangaroo rat)
norvegicus	ordii ordii
rattus rattus	
rattus dexandimus	
Genus *Mus* (mouse)	
musculus	
Order *Lagamorpha*	
Family Leporidae (hares and rabbits)	
Genus *Sylvilagus*	
nuttalli nuttalli	

*Modified from Zentner

for distribution will have increased bearing on the ultimate methods of control.

TABLE 3*

ARTHROPODS IMPORTANT IN THE TRANSMISSION OF PLAGUE WITH THEIR PRINCIPAL HOSTS IF NATURALLY INFECTED

Subphylum *Insecta*

Order *Aphaniptera* (fleas)
- *Xenopsylla* cheopis (domestic rats)
  - astia
  - hos:licensis
- *Ceratophyllus*
  - acutus (ground squirrels — Diamanus Montanus)
  - fasciatus (Nonpyllus fasciatus) — (domestic rats)
  - anisus (Monopsyllus anisus) (chipmunks)
  - esoquonum (Suslik, marmot)
  - gallinae (birds, occasionally on mice)
- *Oropsylla* silantieri (tarbagan)
- *Dinopsyllus* lypusus (gerbille)
- *Leptopsylla* musculi (rats)
- *Ctenopthalmus* argytes
- *Ctenocephalides* canis (cats and dogs)
  - felis (cats and dogs)
- *Pulex* irritans (human, and dogs, cayotes, skunks)

Order *Anophera* (lice)
- Haematopinus columbianus
- Linognathoides citelli

Subphylum *Arachnida*

Class *Acarina* (ticks)
- Ixoides autumulis
- Rhipicephalus schulzei
- Argas persicus
- Hyalamina volgense
- Dermacentor silvanum

*Modified from Steinhaus and Eskey and Haas.

POTENTIALITIES AS A RESERVOIR FOR INFECTION IN MAN

From a practical standpoint we are obviously interested in knowing what all of this mass of data and speculation means in terms of potentialities for human plague infection. Much of this has already been brought out (that is, it persists in a given locality, it spreads slowly, it can be transmitted to man, role of fleas, and so on) and need not be further discussed. From the charts on distribution it has been shown that sylvatic plague is widespread and found in many different species of rodent. But certain other questions naturally arise: Can it spread from wild rodents to rats and are rats necessary to cause epidemics in man? What is the virulence for man? What measures can be employed to control this infection in rodents and are they efficacious? These are only a few. For the answers to many of these problems one must rely on the writings of the investigators in those areas, Southeastern Russia, Mongolia, and South Africa, where wild rodent plague has long been known and decide to what extent their findings can be transferred to the United States. Even though in these areas the studies are not entirely conclusive, we can get some idea of the problem from them.

It has long been recognized that the principal rodent involved in the spread of plague to man in epidemic form was the rat. Stallybass tells us, with regard to the relation of sylvatic plague to rat-borne plague, that of the former type two centers have long been known, that of Transbaikal and Mongolia where the large rodent, the tarbagan forms a reservoir, and the other center on the steppes of Southeastern Russia infested by the susliks (*Citellus*) and jerboas. It is from these two centers that most of epidemics which have affected man with such devastation have proceeded, and he (Stallybass) even suggests that the Mongolian center was the site of origin of the Hong Kong epidemic of 1894. These centers have been known to give rise to rat epizootics from time to time, such as the Manchurian epizootic of 1928. In this country there is evidence that sylvatic plague can be spread to rats due to the finding of infected rodents in burrows occupied by both rats and wild rodents.

Thus it would seem quite possible that an epidemic might be started if the rats went into the infected sylvatic regions and returned to the cities with the infection, or, if the reverse occurred, the wild rodents invading urban centers.

That rats are not a necessary intermediary between wild rodents and man has been amply shown above. But, so far only one epidemic definitely seems to have been started and sustained without their aid. That occurred in inner Mongolia in 1928

TABLE 4*

DISTRIBUTION OF HUMAN CASES BY STATES 1900-1942 (incl.)

Year	California	Washington	Louisiana	Florida	Texas	Oregon	Utah	Nevada	Idaho	Total
	C. D.	C. D.	C. D.	C. D.	C. D.	C. D.	C. D.	C. D.	C. D.	C. D.
1900	22-22									22-22
1901	30-26									30-26
1902	41-41									41-41
1903	17-17									17-17
1904	10-8									10-8
1907	178-87	3-3								181-90
1908	8-5									8-5
1909	3-1									3-1
1910	3-1									3-1
1911	4-1									4-1
1913	2-2									2-2
1914	1-0		30-40							41-10
1915	1-1		1-0							2-0
1919	13-13		15-5							28-18
1920	1-1		7-3	10-4	33-19					51-27
1921	3-1		3-3							6-4
1922	2-0									2-0
1923	1-0									1-0
1924	41-34									41-34
1925	1-0									1-0
1927	1-1									1-1
1928	3-2									3-2
1933	1-1									1-1
1934	1-0					1-1				2-1
1936	3-0						1-0			4-0
1937	1-1							1-0		2-1
1939							1-0			1-0
1940									1-0	1-0
1941	2-2									2-2
1942										0-0

C—cases.

D—deaths.

*Modified from Hampton.

where in three months 378 persons died of plague. Kurauchi states that 5000 rats were examined but no sign of plague was found among them and he thinks that the infection was transmitted from man to man, but is of the opinion that the suslik was basically responsible.

If we accept as fact that rats are not requisite for epidemics and we know that in rat-borne plague the usual infection is bubonic, with the pulmonic form secondary, what then is the virulence of wild-rodent-borne plague? Wu Lien-Teh and others of the far Eastern writers emphasize that the wild-rodent type is spread directly to man in a highly virulent pneumonic type. Stallybass has gone so far as to suggest that virulence and pneumotropism are characters associated with sylvatic plague and that they are diminished by passage through rats. Despite this evidence it would seem from a perusal of the case records and mortality statistics that sylvatic plague as transferred to man in the United States was not pneumonic nor so extremely virulent. This was early brought out by McCoy who considered the condition subacute. Subsequent observations of the isolated cases tend to

bear this out and it has been noted that not infrequently the initial case is of the bubonic type.

Bearing the foregoing ideas in mind one realizes that it is at least theoretically possible that plague might appear in epidemic proportions provided certain conditions, as yet inadequately understood, are conducive to an increased distribution of the infective agent. How to prognosticate epizootics with their potential dangers to man is a complex problem which requires field investigations and analysis by mammalologists and entomologists.

If there is a real danger certainly steps should be taken to bring the problem under control. One must not get the impression that there is any unanimity of opinion on the subject. McCoy, in a personal interview, expressed doubt as to the realness of the danger to man from the Public Health point of view. He doubts that any serious epidemic is likely to occur as experience of forty years has shown that small direct danger from sylvatic plague exists. He also feels that if rats in cities should be infected from sylvatic sources our control measures against rat-borne plague are sufficient to prevent any serious outbreak. Other workers, notably Kellogg and Creel, are of the opinion that there is great epidemic danger to man. The former states that there is the possibility of direct extension of the disease across state lines and that it may travel by transference to the rats in urban centers in ships and freight cars. Creel feels that there is no reason to suppose that it will not reach the rats of the Mississippi Valley, where Ackert has recently reported the Oriental rat flea (*X. cheopis*) on rats, and if it does "the record will be a lasting memorial to the apathy of the Public Health officials in the United States."

CONTROL

Even though the danger of epidemic plague may not be with us, for the benefit of the occasional victim some efforts at control should be made. Among the procedures recommended the following are included.

(1) Buildings should be rat and rodent proof, and so far as possible should be deflead.

(2) The public should be warned not to touch or play with chipmunks or other wild rodents, especially in areas of epizootics.

(3) Epizootics should be carefully studied.

(4) Rodents should be quarantined before sale.

(5) Poisoning and gassing of burrows should be carried out wherever possible.

(6) Samples of rodent and flea populations should be studied from time to time.

(7) Intensive cultivation is an excellent control measure as the agriculturists will not tolerate the presence of rodents.

Meyer is of the opinion that sylvatic plague, unlike rat-borne plague which rises and falls within a century and finally flickers out, wild rodent sylvatic plague is everlasting and permanent. Creel, on the other hand, contends that the expenditure of $2,500,000 would be sufficient to exterminate sylvatic plague as it now exists in the western United States, if a well organized and sustained campaign were gotten underway. All of this is pure speculation. We do know one thing—plague was "built out" of Chinatown, as no cases were reported there in 1907 and 1908, following the clean-up during the period 1900-1904.

SUMMARY

(1) An historical review of plague in the United States is given.

(2) Ecological evidence for the possible origins of plague is presented.

(3) The distribution of plague in the United States is graphically presented.

(4) Its potential danger to man is mentioned.

(5) Control measures are listed.

CONCLUSION

Plague is established in the wild rodent populations of the Western states. Where or when this sylvatic plague originated is undetermined as are its distribution and potential danger to man.

REFERENCES

Ackert, J. E.: Oriental rat fleas established in Kansas, Science, 93:566, 1941.

Blue, R.: Anti-plague measures in San Francisco, J. Hyg., 9:1, 1909.

Boelter, W. R.: The Rat Problem, John Bales, Sons & Danielsson, London, 1909.

Byington, L. B.: Two epizootics of plague in wild rodents in Western U. S. in 1938, U. S. Pub. Health Rep., 55:1496, 1940.

Creel, R. H.: Plague situation in the Western U. S., Am. J. Pub. Health, 31:1155, 1941.

Currie, D. H.: Report on a case suspected of being plague, Pub. Health Rep. U. S. Marine Hosp. Service, 19:2408, 1904.

Dickie, S. M.: Plague in California, 1900-1925, Proc. Conf. State & Prov. Health Authorities of North Am., 1926.

Ergorov, A.: The role of raptorial birds in the epidemiology of plague, Rev. Microbiol. & Parasitol., 12:133, 1933. (In Trop. Dis. Bull. 31:305, 1934).

Eskey, C. R.: Fleas as a vector of plague, Am. J. Pub. Health, 28:1305, 1938.

Eskey, C. R., and Haas, V. H.: Plague in the Western part of the U. S., Pub. Health Bull. 254, Washington 1940.

Evans, F. C., and Holdenried, R.: Field study of ground squirrels in relation to sylvatic plague, Proc. Soc. Exp. Biol. & Med., 47:63, 1941.

Fourie, L.: Epidemic focus of plague, So. African M. J., 12:352, 1938.

Hampton, S. C.: Plague in the United States, U. S. Pub. Health Rep., 55:1143, 1940.

Jellison, W. L.: Sylvatic plague—studies of predatory and scavenger birds in relation to its epidemiology, U. S. Pub. Health Rep., 54:792, 1939.

Jorge, R.: Ronguers et Puce, Masson et Cie, Paris, 1928. (Referred to by Meyer).

Kellogg, W. H.: Present status of plague, Am. J. Pub. Health, 10:834, 1920.

Kellogg, W. H.: Plague, California & West. M. J., 41: 103, 1934.

Kellogg, W. H., The plague situation, Am. J. Pub. Health, 25:319, 1935.

Kurauchi, K.: Epidemiology of plague in inner Mongolia, J. Orient. Med., 12:33, 1930. (In Trop. Dis. Bull., 27:732, 1930).

Kurauchi, K.: Differentiation of *B. pestis* from allied organisms by means of their biological properties, Kitasato Arch. Exp. Med., 8:45, 1931.

Long, J. D.: Plague eradication in California, U. S. Pub. Health Rep., 29:3103, 1924.

McCoy, G. W.: Plague among ground squirrels in America, J. Hyg., 10:39, 1910.

McCoy, G. W.: Studies upon plague among ground squirrels, Public Health Bull., 43, Washington 1941.

McCoy, G. W.: The problem of plague in the United States, Am. J. Hyg., 1:182, 1921.

McCoy, G. W., and Wherry, W. B.: Subacute plague in man due to ground squirrel infection, J. Infect. Dis., 6: 670, 1909.

McCoy, G. W.: Personal communication.

Meyer, K. F.: Sylvatic plague, California & West. M. J., 41:103, 1934.

Meyer, K. F.: Sylvatic plague, Am. J. Pub. Health, 26:961, 1936.

Meyer, K. F.: Sylvatic plague, Am. J. Pub. Health, 27: 777, 1937.

Meyer, K. F.: Sylvatic plague, Am. J. Pub. Health, 28: 1153, 1938.

Meyer, K. F.: Sylvatic plague, Am. J. Pub. Health, 29: 1225, 1939.

Meyer, K. F.: Sylvatic plague, Am. J. Pub. Health (Supplement), 31:145, 1941.

Meyer, K. F.: The disposition of rodents as a factor in the epidemiology of plague, Medico-Surgical Tributes to Harold Brunn, Univ. of Calif. Press, Berkeley, 1942. (pg. 307).

Meyer, K. F.: Ecology of plague, Medicine, 21:143, 1942.

Meyer, K. F.: The known and unknown in plague, Am. J. Trop. Med., 22:9, 1942.

Meyer, K. F., and Eddie, B.: Persistence of sylvatic plague, Proc. Soc. Exp. Biol. & Med., 38:333, 1938.

O'Conner, F. W.: Concern of the United States with tropical diseases, Am. J. Pub. Health, 25:1, 1935.

Pirie, J. H. H.: Plague in northwest of the Cape Province, J. M. Assn. So. Africa, 1:50, 1927.

Rucker, C. W.: Plague among ground squirrels in Contra Costa County California, U. S. Pub. Health Rep., 24: 1225, 1909.

The Rat and Its Relation to Public Health (various authors), U. S. Public Health Bull. 30, Washington, 1910.

Smith, G.: Plague on Us. Commonwealth Fund, New York, 1941.

Stallybass, C. O.: Principles of Epidemiology, MacMillan, New York, 1931. pg. 310.

Steinhaus, E. A.: Catalogue of bacteria associated etracellularly with insects and ticks, Burgess, Minneapolis, 1942.

Stewart, M. A.: Comparative study of rodent and burrow flea population, Proc. Soc. Exp. Biol. & Med., 47:140, 1941.

U. S. Public Health Service Weekly Reports, 1900 to date.

United States P. H. S. Annual Reports, 1900 to date.

Wheeler, C. M., et al.: Role of the burrowing owl in the spread of plague, Science, 93:560, 1941.

Wheeler, C. M., and Douglas, J. R.: Transmission studies on sylvatic plague, Proc. Soc. Exp. Biol. & Med., 47:65, 1941.

Wheery, W. H.: Plague among ground squirrels of California, J. Infect. Dis., 5:485, 1908.

Wu Lien-Teh: The perpetuation of plague among wild rodents, Am. J. Hyg., 8:649, 1928.

Wu Lien-Teh: Manchurian Plague Prevention Service, Memorial Volume, 1912 to 1932, National Quarantine Service, Shanghai, 1934. (Reviewed in J. A. M. A., 105:535, 1935).

Zentner, H. M.: Human Plague in the U. S. 1900-1940, Tulane University, New Orleans, 1942.

THE COMMON DISEASES AND INJURIES OF THE SPINE*

EDWIN W. RYERSON, M. D.
CHICAGO

Pain in the back is one of the most frequent symptoms which orthopedic surgeons are called upon to interpret. Years ago, when tuberculosis of the bones was very common, many children and not a few adults came to our clinics with definite Pott's disease. Nowadays we seldom see cases of spinal or sacro-iliac tuberculosis, because in most communities the proper control of pulmonary tuberculosis has been learned, both in human beings and in cattle. If all persons with consumption would stop spitting promiscuously, and if all tuberculous cattle could be destroyed, our country would soon be free from this deadly disease.

*Read before the New Orleans Graduate Medical Assembly, New Orleans, March 18, 1943.

In Pott's disease, the bacilli are carried by the blood-stream into the body of a vertebra, and there they multiply and begin to destroy the bone. Soon they penetrate through the cortex and destroy the intervertebral disc, and then invade the next vertebra. As the vertebral bodies break down, a sharp angle appears in the spine, the typical kyphosis. A "cold" abscess begins to form, and the patient's course is steadily downward unless the proper treatment is instituted.

A very long experience has convinced me that the best treatment for tuberculous spondylitis is an operation which will fasten together the diseased vertebrae. This is done at the back of the spine, where there are no large nerves or blood-vessels to be damaged. It is much safer for the average patient to take the risk of this operation than to spend years and years lying down upon a frame or stretcher, or wearing casts and braces for an indefinite time and then finding that the disease is still as active as ever.

Perhaps I have spent too much time in discussing this disease, but I have been doing these operations for nearly thirty years, and can recommend the method most highly in suitable cases.

OSTEOARTHRITIS

Osteoarthritis, perhaps better called osteoarthrosis, of the spine is the most common cause of pain in the back. The Marie-Strümpell variety results in a complete, solid ankylosis of the vertebrae. Its exact cause is unknown. It occurs chiefly in young men, and must be treated by a long back-brace with shoulder-straps to prevent the forward bending of the spine which will inevitably take place without such protection. It is not very common. The pain disappears when the spine has become ankylosed, in two or three years.

The ordinary kind of osteoarthritis does not cause ankylosis, but does cause pain, especially when it affects the true joints of the spine, the small articulations at each side of the spinal canal. The disease irritates the edges of these joints, and bony spurs are formed which may press upon the nerves. These small spurs are exactly like the large spurs so frequently seen at the upper and lower edge of the bodies of the vertebrae in people of advanced age. The difference is that the large spurs on the vertebral bodies are usually caused by the ordinary wear and tear of daily occupation, while the small spurs on the articular facets are more apt to be the result of rheumatoid or toxic osteoarthritis. Nearly all persons over 55 years of age will be found to have these large spurs on some of the vertebrae, and very few of them will suffer pain from the spurs.

Rheumatoid or toxic arthritis, then, is the etiologic factor in many of the painful backs, and a careful search must be made to find the focus of infection or the chemical or metabolic disturbance responsible for the symptoms. I have seen many cases where the removal of tonsils or the drainage of infected sinuses has been followed by complete relief. Infection at the root of a tooth is another cause. A gouty arthritis is much more common than most of us were taught to believe, and can be immensely improved by attention to the diet. The laboratory tests, the leukocyte count, the sedimentation rate, the urea determination, and many others, are all useful in deciding the variety of arthritis which is present. The influence of climate is very important. As a general rule, arthritic patients do much better in a warm, sunny, dry atmosphere.

The treatment of the back itself is relatively simple. If bending or twisting motions of the spine cause pain, these motions should be prevented or limited by braces or corsets or plaster of Paris body-casts. The most useful brace is the long Taylor back-brace, which has to be made to order to fit the individual patient. C. F. Taylor designed it more than eighty years ago, for the treatment of tuberculosis of the spine. It does not cure Pott's disease, but it certainly helps to cure arthritis. The brace or the corset should be worn until the back becomes painless on motion. This may require a very long time. Physical therapy, massage, heat, light, and mud baths may

all be useful. The various vaccines, drugs and medicines used by the general practitioners will not be discussed here, except to say that some men report good results from the gold treatment. Others say it is dangerous. The Federal government says gold is no good for money, but has not yet restricted it as a medicine. I have had very little experience with gold in either form.

COMPRESSION FRACTURES OF THE VERTEBRAE

The bodies of the vertebrae can be fractured by surprisingly slight injuries. A sudden forward flexion of the spine, as in an automobile collision or slipping on the ice, may drive the front edge of a vertebra downward into the upper surface of the next vertebra below. The intervertebral disc does not offer sufficient resistance to prevent a considerable compression of the vertebra beneath it. These fractures occur most frequently at the twelfth dorsal or the first lumbar region, but have been seen often at higher or lower levels. They very seldom cause any damage to the spinal cord, because the force applied is generally not very great. They do cause pain in the back, which is often not severe enough to arouse suspicion of an actual compression fracture, so that many of these patients go along for weeks or months before an x-ray examination is made. Lateral x-ray films should always be made, as the antero-posterior views may fail to show a compression of moderate degree.

These fractures may sometimes be seen in young people, but the majority of them occur in late adult life, and especially in elderly persons whose bones have become decalcified because they do not drink enough milk. Old ladies, and some who are not so old, are afraid of getting too fat if they drink milk. They drink plenty of tea and coffee, however, with cream and sugar, so they get fat just the same, and their bones become demineralized and weakened. They usually tell the doctor that milk does not agree with their stomachs, which is perfect nonsense. We must make them drink skimmed milk, which is not fattening and contains calcium in its most assimilable form. The old-fashioned calcium lactate tablets should be given, also, over long periods of time. I have seen many old ladies whose spines were fractured in several places when the automobile stopped suddenly or a wheel went into a hole in the street. Decalcification of the bones may also be seen in disorders of the parathyroid glands, but I have not seen many such cases.

The orthopedic treatment of the damaged vertebrae has been much improved in recent years, through the work of A. G. Davis, Dunlop, O'Donoghue and many others. We now make an effort to reduce the amount of compression of the vertebral body by bending the spine backward sufficiently to pull up the crushed portion of the vertebra to its original height. This may be done by placing the patient face down between two tables, with the body sagging downward. The strong anterior ligament which connects the vertebral bodies is attached to the upper and lower margins, and with hyperextension of the back it will usually pull apart the fractured surfaces enough to restore the normal height of the vertebra. It requires much care to hold the patient securely between the tables, and several assistants are necessary. A plaster of Paris body-jacket is accurately applied from the top of the chest to the hips, with plenty of padding over the crest of the ilium.

Other methods of hyperextending the spine have been developed, such as O'Donoghue's automobile jack, which is used with the patient lying on the back. I described an attachment to the jack which makes it easy to apply a plaster of Paris jacket very accurately with little discomfort to the patient. The degree of hyperextension is under perfect control, and the jacket can be moulded very accurately over the chest and pelvis.[1]

The jacket or brace must be worn until the body of the vertebra has filled completely with solid bone. This will require at least four months, because the gap does not fill rapidly and the new bone does not become hard in less than four months. It may take longer than this, and should be

checked by x-ray examination before removing the support. In hot weather, the plaster jacket may be too uncomfortable, and can be replaced by a Taylor back-brace. The results of this method of reduction of compression fractures have been extremely satisfactory.

VERTEBRAL ANOMALIES

Pain in the back may be caused by congenital defects in the construction of the vertebrae. Such anomalies as spina bifida occulta, sacralization of one side of the fifth lumbar vertebra, and spondylolisthesis (the sliding forward of a vertebral body over the one beneath) may produce a mechanical disturbance and pain. Bad posture, especially the kind where the lumbar curve (lordosis) is excessively increased, may cause a painful shearing strain upon the lumbo-sacral joints. Braces and postural training may relieve some of these complaints, and others may require a spinal fusion operation to transfer the strain to a higher level where the more normal vertebrae can take up the work at a better mechanical advantage. The animals who walk on four legs, with the back horizontal, do not have any of these mechanical disturbances at the lumbo-sacral junction, but we human beings who walk erect have not yet developed a perfect low-back mechanism. The weak spot is where the movable lumbar vertebrae join the solid mass of the sacrum. All of the bending and twisting movements of the torso throw strains and stresses upon this lumbo-sacral joint. All the weight of the body, the head and the arms is borne upon this joint. It never was a very good joint, anyway. Its component parts are more often defective or anomalous than any other ten joints in the human body. The third lumbar joint, and usually the fourth, are much better anatomically than the lumbo-sacral joint, and they do not slant down-hill. This is why the fusion operations are so successful, because the third, fourth and fifth lumbar vertebrae are ankylosed solidly to the sacrum, and the work is transferred from an imperfect joint up to a level where the joint is perfect.

INTERVERTEBRAL DISC EXTRUSIONS

During the last few years a great many articles have been published about extrusions or herniations of the intervertebral discs. The syndrome of sudden, acute pain in the low back, radiating down one or both sciatic nerves into the thigh, the calf and the outer side of the foot, with diminution of the ankle-jerk, has been described as pathognomonic of a rupture of the fibrous covering of the disc with protrusion of a portion of the disc or of the nucleus pulposus into the spinal canal. Many hundreds of operations have been performed for the removal of these extruded masses, with immediate and permanent relief of all of the symptoms. Nearly all of the cases so far described have occurred at the lumbo-sacral interspace, with a few at the fourth lumbar, and a very few at a higher level in the spine.

Let us consider the subject from several different points of view. This condition cannot be a new pathologic entity. Many people must have had this same symptom-complex during the last few thousand years. What became of them all, before neurologic surgeons were invented? None of them died of the disorder, because it never kills anyone. Looking back over forty years of active practice in orthopedic surgery, I do not seem to remember any patients with these symptoms who did not eventually recover. Some of them had manipulations of the spine, under the belief that the sacro-iliac joints had slipped out of place. The osteopaths and other kinds of practitioners, and some of the regular medical profession, undoubtedly relieved many cases of disc extrusions by manipulative methods. If a disc can slip out of place, it is quite possible that it can slip back into place again, and this is proved by many cases of disc extrusion where complete remissions of symptoms occur under conservative treatment. Some of the patients who were not cured by conservative treatment were cured by spinal fusion operations during a remission. A disc is extruded only by motion of the vertebrae. If this motion is prevented by fusing the vertebrae together, the disc

cannot again become extruded. From a practical standpoint, however, it is difficult to persuade a patient to have a fusion operation performed during a remission, because his back is now free from pain, and he thinks it may never hurt him again. Many people, however, suffer such frequent recurrences that they finally accept operative treatment.

Before discussing the surgical problems, let me outline the general plan of conservative management. The patient is put to bed, with a back-rest to hold the body at an angle of thirty degrees. The knees are flexed by pillows or a support of some kind. No form of traction to the leg should be used, as this usually increases the pain. Sedatives are given if necessary, and heat is applied to the lower back. Manipulation of the back, under an anesthetic, may be attempted, but, as in J. E. Goldthwait's[2] celebrated case, there may be the danger of producing paralysis if too much force is used. A week or two in bed, with the lumbar spine flexed, will generally relieve the acute pain, and a corset or brace should then be applied to be worn for a few weeks. If recurrences follow this conservative treatment, the question of operation may properly be considered.

It is not a dangerous or difficult procedure to remove an extruded disc. The injection of lipiodol into the spinal canal was formerly used to determine the extent and location of the extrusion, but this method has lost its popularity because it was sometimes followed by irritation in the canal and because the symptoms of extrusion are now much better understood. It is possible, in many cases, to extract the disc through a small opening between the laminae, without weakening the mechanical structure of the vertebral column. In some clinics the patients are allowed to go home in two weeks after such operations, apparently entirely well.

Here is where I disagree with many recognized authorities. After a portion of a disc has been removed, the rest of the disc degenerates and becomes flattened. The vertebra above it sinks down upon the vertebra below, and the space at the sides, where the nerves emerge from the spinal canal, becomes much diminished. The articular surfaces become overlapped, and a traumatic arthritis develops which may cause severe symptoms. These same symptoms have been encountered in many cases where no operation has been performed, where the disc has become degenerated from other causes than extrusion. Such cases have been recognized as clinical entities long before we knew very much about disc extrusions, and we cured them by fusing the vertebrae together.

It is therefore my present belief that when a disc extrusion has been removed by operation at the lumbo-sacral interspace, the fourth and fifth lumbar vertebrae, and perhaps also the third, should be fastened to the sacrum by one of the accepted methods of spinal fusion.

Why should we simply pull out the small piece of disc which is pressing on the nerve, and make no attempt to repair the defective mechanical structure which caused the extrusion of the disc?

REFERENCES

1. Ryerson, E. W.: Automobile jack for fractured spine, J. A. M. A., 103:562, 1934.

2. Goldthwait, J. E.: The lumbosacral articulation; an explanation of many cases of "lumbago", "sciatica" and paraplegia, Boston M. & S. J., 164:365, 1911.

INDICATIONS FOR VITAMIN THERAPY*

GRACE A. GOLDSMITH, M. D.†
NEW ORLEANS

Extensive research in the field of vitamins in the past few years has resulted in a tremendous increase in our knowledge of these essential food factors. New vitamins have been discovered, chemically identified, and their function studied in both animals and man. Frequently these vitamins have been made available for clinical use before their role in normal physiology, or their

*Read before the Orleans Parish Medical Society, May 10, 1943.

†From the Department of Medicine, School of Medicine, Tulane University and Charity Hospital of Louisiana, New Orleans, Louisiana.

importance in disease processes have been adequately investigated. The practicing physician has been bombarded with literture containing therapeutic claims which have not always rested on a sound scientific foundation. The busy clinician does not have time to review the literature and evaluate findings. As a result, he has either become enthusiastic and used vitamins indiscriminately, or he has decided in disgust, that vitamins are worthless and used them not at all. Neither attitude is correct and both tend to obscure the importance of adequate nutrition in which vitamins play a significant role.

Rational vitamin therapy can be planned only if certain fundamentals are appreciated. An adequate concept of the term vitamin is important. A vitamin may be defined as a chemical substance which is essential in small amounts for normal bodily function, which cannot be manufactured by the cells of the body and must, therefore, be supplied from an outside source, usually the diet. In order to delineate the indications for the use of a given vitamin it is essential to know the role it plays in bodily physiology, the daily requirement, the factors which may modify this requirement and the pathologic changes which occur when an insufficient amount of this specific compound is available. When vitamin deficiency occurs, certain signs and symptoms make their appearance and these, together with laboratory tests, permit the physician to evaluate the nutritional status. Many of the laboratory procedures which have been developed are, as yet, too complicated for routine use, but if the clinical findings in deficiency disease are recognized, and bodily needs appreciated, rational therapy can be instituted. The quantity of vitamins prescribed and the method of administration are dependent upon the severity of the deficiency and factors which may modify absorption and requirement. The requirement is variable, a small quantity being needed for the maintenance of normal processes, a larger amount in certain states of emergency and still more when deficiency disease has occurred and pathologic changes must be reversed.

A few principles may be mentioned which apply to all deficiency states. The clinical manifestations vary with the degree and the duration of the deficiency. The symptoms and signs of acute deficiency differ markedly from those of chronic deficiency and findings of mild dietary inadequacy are often unlike those of severe depletion. Most of the clinical syndromes which have been recognized for years are those of severe chronic deficiency such as beriberi, scurvy, and pellagra. Only recently have the syndromes of mild chronic deficiency, or of acute depletion been described. A list of symptoms and signs which are suggestive of early deficiency disease has been compiled by the Subcommittee on Medical Nutrition of the Division of the Medical Sciences, National Research Council[1] (table 1). The earliest findings are often general and non-specific, such as anorexia, lassitude, loss of weight and strength, and lack of mental application. As deficiency progresses, specific signs of diagnostic value appear.

The causes of deficiency disease are many, the most obvious being an inadequate diet due to poverty, ignorance, or racial and environmental food habits and customs. Other factors etiologically important in contributing to, or precipitating vitamin deficiency include any condition which interferes with the intake, absorption, storage, utilization, or excretion of essential food substances, or which increases the need of these elements. Factors which interfere with the intake of food are anorexia, poorly fitting dentures, nausea and vomiting, and limited therapeutic diets, such as those used in obesity, gastrointestinal disease, allergy, or after operative procedures. Inadequate absorption of nutrients may occur in diarrheal diseases, in inflammatory lesions of the intestinal tract, in sprue and other steatorrheas, in achlorhydria, in the absence of the normal biliary, pancreatic, or intestinal secretion, and as a result of repeated aspiration of gastric, or intestinal contents, or of short circuiting operations on the gastro-

TABLE 1

SYMPTOMS OF VITAMIN DEFICIENCY

Lack of appetite	Paresthesias
Lassitude and chronic fatigue	Night blindness
Loss of weight	Photophobia
Lack of mental application	Burning or itching of eyes
Loss of strength	Lacrimation
History of sore mouth and tongue	Muscle and joint pains, muscle cramps
Chronic diarrhea	Sore bleeding gums
Nervousness and irritability	Tendency to bleed

PHYSICAL SIGNS OF VITAMIN DEFICIENCY

Nasolabial sebaceous plugs	Bilateral symmetrical dermatitis
Cheilosis	Purpura
Vincent's angina	Dermatitis, facial butterfly, Casel's necklace, perineal, scrotal, vulval
Minimal changes in color or texture of tongue	Thickening and pigmentation of skin over bony prominences
Red, swollen lingual papillae	Non-specific vaginitis
Glossitis	Follicular hyperkeratosis extensor surfaces of extremities
Papillary atrophy of tongue	Rachitic chest deformity
Stomatitis	Anemia not responding to iron
Spongy, bleeding gums	Fatigue of accommodation
Muscle tenderness, extremities	Vascularization of cornea
Poor muscle tone	Conjunctival changes
Loss of vibratory sensation	
Increase or decrease of tendon reflexes	
Hyperesthesia of skin	

intestinal tract. The storage and utilization of a number of the vitamins are impaired in disease of the liver. Vitamin deficiency may occur as a result of increased excretion in diabetes mellitus, diabetes insipidus, following excessive administration of fluid and during lactation. The requirement of many of the vitamins is increased by fever, hyperthyroidism and other conditions characterized by an increase in metabolism. Requirements are greater during periods of rapid growth, in pregnancy and during lactation. A high carbohydrate diet will increase the need of the "B" vitamins. Chronic alcoholism interferes with both the intake and absorption of food. In the aged, numerous factors contribute to the high incidence of deficiency disease.

In the discussion to follow, the indications for therapy with vitamin A, with three members of the B complex, thiamin, niacin, and riboflavin, and with ascorbic acid will be considered. Each of these vitamins has been extensively studied and much definite information is available regarding its use.

VITAMIN A

The optimal daily requirement of vitamin A as recommended by the Food and Nutrition Board of the National Research Council* is 5,000 international units for the average adult. Vitamin A is important in the maintenance of normal epithelium and in the visual process where it functions in rod vision as a part of the visual purple molecule and probably, also in cone vision as a component of visual violet. Deficiency of vitamin A causes night blindness and a keratinizing metaplasia which may affect any epithelial surface, but especially the skin lesions appear as a follicular hyperkeratosis, present first one the antero-lateral aspect of the thighs, later on the extensor surfaces of the arms and forearms and finally generalized in distribution. The severe lesion of vitamin A deficiency is called phrynoderma, or toad skin. An acneform lesion of the buttocks is frequently present. Visual symptoms, besides night blindness, include itching, burning and dryness of the eyes, and photophobia. Conjunctival

*All figures for daily allowances of vitamins are taken from the recommendations of the Food and Nutrition Board of the National Research Council.

changes consist of diminished luster and thickening of the conjunctivae, increased vascularity, Bitot's spots and, in advanced deficiency, xerophthalmia. According to Kruse, changes in the conjunctivae are the earliest findings in vitamin A deficiency, when examination is made with a biomicroscope.

The indications for therapy with vitamin A include any condition in which the lesions described above occur. Vitamin A is specific for xerophthalmia, phrynoderma, and for most cases of night blindness without organic eye disease. It is unnecessary to give supplementary doses of vitamin A to normal persons taking an adequate diet. There is no evidence that amounts of this vitamin, in excess of requirements, are beneficial, or that they reduce the incidence of infections as has been claimed. When the diet is inadequate, then supplements are legitimate. During pregnancy, it is probably wise to increase the intake of vitamin A. The absorption of carotene, the precursor of vitamin A, which is found in green and yellow vegetables, is hindered by diets low in fat and by mineral oil. If a low fat diet is prescribed therapeutically, for weight reduction, or cholecystitis, vitamin A should be administered. It is probably wise to give this vitamin when mineral oil is taken regularly. Vitamin A has been used successfully in treating a number of ophthalmologic conditions, in follicular conjunctivitis, phlyctenular disease and as a local application into the conjunctival sac in many diverse states. A number of clinical conditions interfere with the absorption of vitamin A, namely, chronic ulcerative colitis and diseases associated with malabsorption of fat, such as sprue, celiac disease and obstructive jaundice. In these pathologic states vitamin A should be administered in large amounts. Patients with liver disease often show poor dark adaptation and epithelial changes characteristic of vitamin A deficiency. Vitamin A is stored in the liver and that organ is responsible for the conversion of carotene to vitamin A. Hence, therapy is indicated in cirrhosis and in other types of hepatic damage. In diabetes mellitus carotene is not satisfactorily converted to vitamin A. The same is true of hypothyroidism. In these diseases small supplementary doses of vitamin A appear to be beneficial. Vitamin A has been recommended in the treatment of urinary lithiasis, but available evidence has not shown such therapy to be efficacious.

In mild deficiency states 10,000 to 30,000 I. U. daily are effective therapy. In severe deficiency 50,000 to 100,000 I. U. may be given. Vitamin A may be administered parenterally if desired. Healing of the skin and conjunctival lesions is relatively slow and may take several months. Recovery from night blindness varies from a few days to weeks, or even months.

VITAMIN B COMPLEX

The members of the vitamin B complex which are known to be essential to man and which have been sufficiently studied to be important clinically, are thiamin, riboflavin and niacin. Since the "B" vitamins have a somewhat similar distribution in nature, deficiency of one of the group is often accompanied by deficiency of the others as well. In function, too, the "B" vitamins are related. Each of them is important in one or more enzyme systems in cellular metabolism. Thiamin functions as the enzyme cocarboxylase in the breakdown of pyruvic acid in intermediate carbohydrate metabolism. Niacin forms the active portion of coenzymes I and II and riboflavin of several enzymes which are known to be important in oxidation-reduction reactions in the tissues, especially those involving carbohydrate.

THIAMIN—VITAMIN B_1

The daily requirement of adults is from 1.2 to 2.3 mg. It varies with the caloric intake and with the carbohydrate content of the diet. The early findings in deficiency have been studied experimentally in human beings by Williams,[2] and by Jolliffe,[3] and have been found to resemble neurasthenia. From a biochemical standpoint there is impairment of carbohydrate tolerance and an accumulation of pyruvic acid in the blood and tissues. The late findings are peri-

pheral neuritis, edema and the cardiovascular changes characteristic of beriberi. Early symptoms of peripheral neuritis are burning of the feet, paresthesias of the lower extremities and cramps in the muscles. Signs include calf muscle tenderness, hyperesthesia of the skin, pretibial anesthesia, muscular weakness and an increase, or decrease in tendon reflexes. Anesthesia, absent reflexes and muscular atrophy occur in advanced deficiency. The lower extremities are extensively involved before the upper are affected. Cardiovascular findings include edema and signs of right sided heart failure. The edema may appear before any dyspnea is noted, is often massive and accompanied by effusions into the serous cavities. Tachycardia, a wide pulse pressure, enlargement of the heart to both right and left, gallop rhythm, systolic murmurs and a normal or decreased circulation time are frequent manifestations. The electrocardiogram often shows low complexes, flattening of the T waves and prolongation of the Q - T interval. Acute circulatory collapse may occur. A diagnosis of beriberi heart hisease is made on the basis of the above findings, the history of an inadequate diet, the absence of the usually etiologic factors in heart disease and a rapid response to the administration of thiamin.

The most obvious indications for therapy with vitamin B_1 are dry and wet beriberi as described above. The average American diet is apt to be deficient in this vitamin since it contains such a large percentage of sugar and of highly refined cereals from which the "B" vitamins have been removed. In the presence of probable signs and symptoms of deficiency and when the dietary history suggests a low thiamin intake, it is advisable to administer small amounts of this vitamin. The neuritis of chronic alcoholism and that which occurs during pregnancy respond to treatment with thiamin. There is considerable controversy in regard to the value of vitamin B_1 in diabetic neuritis. If the lesion involves the lower extremities and is bilateral, thiamin may be of value. In achlorhydria and during therapy with alkalis, an additional quantity of thiamin may be needed because of inadequate absorption. There is an increased requirement of thiamin in fevers and in hyperthyroidism. Vitamin B_1 may aid in preventing loss of weight in the latter condition and is of assistance, together with the other "B" vitamins, in the preoperative preparation of patients with thyrotoxicosis. The use of intravenous glucose in postoperative therapy may precipitate thiamin deficiency in individuals whose nutritional state was suboptimal prior to surgery. Thiamin should be given in conjunction with infusions. The stabilization of diabetes with insulin, may likewise precipitate thiamin deficiency by increasing the quantity of carbohydrate utilized and thus raising thiamin requirement. Thiamin may be useful in the treatment of Wernicke's encephalitis and of delirium tremens. The value of thiamin in a number of other neurologic conditions such as herpes zoster, trigeminal neuralgia and Korsakoff's syndrome has not been decided, but is worthy of further study.

Thiamin has been widely used in the treatment of anorexia. It is of value only if the poor appetite is due to vitamin B_1 deficiency.

The therapeutic dose of thiamin varies from 5 mg. daily in mild deficiency to 15 to 30 mg. daily in severe neuritis and possibly to as much as 50 to 100 mg. daily in the acute cardiac form of beriberi. Neuritic pain is promptly relieved, but restoration of function may take weeks or months. Cardiovascular manifestations may show improvement within a few hours to several days, although weeks may elapse before complete return to normal.

RIBOFLAVIN—VITAMIN B_2

The daily requirement of riboflavin is estimated to range between 1.8 and 3.3 mg., the quantity varying with caloric intake. Early symptoms of deficiency consist of visual disturbances such as photophobia, burning and itching of the eyes, lacrimation, fatigue of accommodation and dimness of vision, and of soreness, or burning of the tongue and mouth, with dysphagia.

The lesions characteristic of riboflavin deficiency are cheilosis, glossitis, a seborrheic dermatitis, and superficial vascularizing keratitis. The lesion of the lips consists of denudation and redness at the line of closure and fissures at the angles of the mouth. The dermatitis occurs in the nasolabial folds, over the bridge of the nose, at the outer and inner canthi of the eyes and occasionally on the forehead, or ears. The tongue is purplish, or magenta red in color, may be deeply fissured and the papillae are flattened and swollen, resulting in a pebbled appearance. In long standing deficiency, the tongue becomes atrophic. The ocular signs of lack of riboflavin are demonstrable at first only with the slit lamp. There is congestion and proliferation of the limbic plexus of vessels with invasion of the cornea by small capillaries which anastamose to form tiers of loops. As vascularization increases it becomes grossly visible and may be accompanied by injection of the conjunctival vessels. The cornea may show superficial punctate opacities, or nebulae in various layers of the substantia propria. Staining with fluorescein will demonstrate early lesions. Not all vascularization of the cornea, or superficial punctate keratitis is due to riboflavin deficiency. In some recent studies, Dr. Butterfield and I have found slight extension of capillaries beyond the sclerocorneal junction in many normal persons. Sandstead[4] has reported similar observations. Superficial punctate keratitis in my experience, may at times, be due to riboflavin deficiency, at other times, to vitamin A deficiency, or it may be due to an infectious process unrelated to a deficiency state.

Ariboflavinosis occurs most frequently in association with niacin deficiency and the characteristic lesions have for years been considered a part of the clinical picture of pellagra. The incidence of riboflavin deficiency is high, and many diseases are complicated by an inadequate supply of this vitamin. Since the factors which precipitate riboflavin and niacin deficiency are similar, they will be discussed in connection with the latter.

The therapeutic dose of riboflavin is from 5 to 30 mg. daily. In a number of persons there appears to be poor absorption of this vitamin and in these instances, administration must be parenteral. Relief of symptoms is prompt but signs may take weeks to disappear, cheilosis responding more rapidly than glossitis or corneal vascularization. Lesions often recur when therapy with riboflavin is discontinued.

NIACIN—(NICOTINIC ACID)

The daily requirement of niacin is unknown, although 12 to 23 mg. has been suggested as probably sufficient. Early symptoms of deficiency include weakness, lassitude, anorexia, digestive disturbances, nervousness, irritability and apprehension. The psychic state may resemble an anxiety neurosis. As deficiency progresses, the mouth and tongue become sore and diarrhea develops. The physical findings in severe pellagra are well known, bilateral symmetrical dermatitis, mucous membrane lesions and psychic disturbances. The dermatitis may involve the face, neck, backs of hands and forearms, the feet, legs, perineum, and genitalia. The skin lesion ranges in severity from mild erythema and edema to the formation of vesicles and bullae with secondary infection and finally pigmentation. The mucous membrane changes include stomatitis, glossitis (a fiery red, swollen tongue), esophagitis, proctitis, vaginitis, and urethritis. Psychic disturbances may be of all types, but delirium predominates in severe pellagra and may progress to dementia. In mild, early niacin deficiency, the tongue is red only at the sides and tip; in long standing deficiency, it becomes markedly atrophic. The dermatitis of mild chronic pellagra is characterized by thickening, and pigmentation of the skin over the bony prominences, especially of the elbows, knees, and dorsum of the feet and ankles, less often of the knuckles and wrists. Niacin deficiency frequently occurs without skin lesions.

Acute severe deficiency of nicotinic acid has been described by Jolliffe,[5] and by Sydenstricker and Cleckley.[6] The findings are those of a toxic psychosis, or of an acute encephalopathy with clouding of consciousness, cogwheel rigidities, and grasping and sucking movements. This picture of severe niacin depletion may appear during acute febrile illnesses such as pneumonia, or postoperatively, especially following the use of large amounts of intravenous glucose. The glossitis and dermatitis of niacin deficiency and the lesions typical of ariboflavinosis may also be precipitated by parenteral feeding with glucose. In any case where such therapy must be prolonged, niacin, riboflavin and thiamin should be given with the infusions.

Treatment of mild niacin deficiency consists of the administration of 100 to 200 mg. of niacin, or niacinamide daily. In acute pellagra, or in encephalopathy, 500 to 1,000 mg. may be needed. When therapy is given parenterally, niacinamide should be used rather than the free acid, since the latter may produce severe vasodilating reactions. Improvement is rapid, especially of encephalopathic manifestations. The lesions of the skin and tongue may take considerable time for complete healing.

Deficiency of any of the members of the B complex may occur in febrile illnesses, in hyperthyroidism, and in fact, in any condition associated with an increase in metabolism. The stomatitis and glossitis of many infectious diseases is related to an inadequate supply of niacin and riboflavin. Deficiency of both of these vitamins may appear when diabetes is treated with a high carbohydrate diet and insulin.[7] Many diabetics show skin lesions and glossitis which improve with niacin and riboflavin therapy. Diarrheal diseases and other conditions associated with malabsorption, including congestive heart failure, often lead to a deficiency of all of the "B" vitamins. In cirrhosis of the liver and in chronic alcoholism, vitamin B complex deficiency is almost a constant finding. Likewise in malignancy, deficiency is common. In treating deficiency syndromes due to lack of any of the "B" vitamins, some source of the entire B complex such as brewers' yeast, or liver extract, should be administered since deficiency is seldom confined to a single vitamin.

The incidence of deficiency of the "B" vitamins is high. In a recent survey of 200 patients admitted to the medical wards of Charity Hospital in New Orleans, 40 per cent showed definite and 67 per cent probable evidence of deficiency of niacin, riboflavin, or of both vitamins.[8] About 25 per cent had evidence of thiamin deficiency as well.

ASCORBIC ACID

The recommended daily allowance of vitamin C is 70 to 75 mg. for adults. Ascorbic acid is essential in the body for the formation and maintenance of the intercellular substance of tissues of mesenchymal origin, such as connective tissue, bone and capillaries. It may have a role in oxidation-reduction reactions, in the metabolism of aromatic amino acids, or in the immunologic mechanism, but none of these functions has been unequivocally demonstrated.

The early manifestations of ascorbic acid deficiency in adults are excessive fatiguability, lassitude and muscle and joint pains. Specific findings are: swollen, tender, spongy gums which bleed readily and perifollicular petechial hemorrhages, especially of the lower extremity. Later, ecchymoses may occur, as well as hemorrhages into the muscles and subcutaneous tissues, hemorrhagic effusions into serous cavities, epistaxis, and bleeding from the gastrointestinal tract. There are changes in the dentine and cementum of the teeth, which in severe scurvy, become loose and fall out. Although frank scurvy is rare, mild vitamin C deficiency is frequent. Loss of vitamin C in the handling and preparation of food contributes largely to this finding.

Vitamin C is important in wound healing, as shown by many workers among them, Crandon, Lund and Dill,[9] who studied this subject in experimental human deficiency.

Vitamin C should be given in the preoperative preparation of patients whenever dietary history, clinical findings, or chemical determinations of ascorbic acid in the blood and urine suggest an inadequate supply of this factor.

Vitamin C deficiency complicates a number of diseases. In peptic ulcer, the therapeutic diet prescribed is apt to be low in ascorbic acid. In fever and infectious processes, the quantity of ascorbic acid in the blood and the amount excreted in the urine is decreased. There appears to be an increased need of vitamin C in infections, and a lack of ascorbic acid may have an unfavorable influence on the course of such illnesses. While therapy with vitamin C in infections has, on the whole, been disappointing, it would seem advisable to increase the intake in diseases of long duration, such as tuberculosis and rheumatic fever. There may be malabsorption of ascorbic acid in diarrheal states and in achlorhydria. Arsenical sensitivity is believed by many to be diminished by the administration of vitamin C. Therapy would appear to be indicated in these conditions.

In treating ascorbic acid deficiency the vitamin should be given in doses of 100 to 1,000 mg. daily, depending on the duration and severity of the depletion. Parenteral administration may occasionally be necessary.

SUMMARY

In the above discussion, a number of the important indications for vitamin therapy have been mentioned. In the evaluation of nutritional status, clinical findings have been stressed since laboratory procedures are available only in large medical centers and must be further simplified before becoming widely used.

In any discussion of nutritional deficiency, it should be emphasized that there is no completely satisfactory substitute for an adequate diet. Such a diet is essential in both the prevention and treatment of deficiency disease. Vitamin deficiencies are usually multiple and poly-vitamin preparations are logical therapy in instances where diet alone is incapable of bringing about restoration to normal. Synthetic crystalline vitamins are indicated for the relief of acute and chronic manifestations of deficiency, for the replenishmen of reserve stores in the body, and temporarily to supply essential chemical substances in pathologic states which interfere with the normal intake, assimilation and utilization of food.

REFERENCES

1. Subcommittee on Medical Nutrition, Division of Medical Sciences, National Research Council—Recognition of Early Nutritional Failure in Infants, Children, Adolescents and Adults, J. A. M. A., 118:615, 1942.

2. Williams, R. D., Mason, H. L., Wilder, R. M., and Smith, B. F.: Observations on induced thiamin deficiency in man, Arch. Int. Med., 66:785, 1940.

3. Jolliffe, N. Goodhart, R., Gennis, J., and Cline, J. K.: The experimental production of vitamin B_1 deficiency in normal subjects: The dependence of the urinary excretion of thiamin on the dietary intake of vitamin B_1, Am. J. Med. Sci., 198:198, 1939.

4. Sandstead, H. R.: U. S. Public Health Reports, 57:1821, 1942.

5. Jolliffe, N., Bowman, K. M., Rosenblum, L. A., and Fein, N. D.: Nicotinic acid deficiency encephalopathy, J. A. M. A., 114:307, 1940.

6. Cleckley, H. M., Sydenstricker, V. P., and Geeslin, L. E.: Nicotinic acid in the treatment of atypical psychotic states associated with malnutrition, J. A. M. A., 112:2107, 1939.

7. Sydenstricker, V. P., Geeslin, L. E., and Weaver, J. W.: Avitaminosis occurring in diabetic patients under insulin therapy, J. A. M. A., 113:2137, 1939.

8. Goldsmith, Grace A.: The incidence and recognition of riboflavin and niacin deficiency in medical diseases, South. Med. J., 36:108, 1943.

9. Crandon, J. H., Lund, C. C., and Dill, D. B.: Experimental human scurvy, New England J. M., 223:353, 1940.

DISCUSSIONS

Dr. Marie Stanbery (New Orleans): We eye doctors are a little spoiled; because ophthalmology is an art and almost a science, we think things ought to be definite. And there is something terribly indefinite about the question of lack of vitamins. The isolation of vitamins as pure chemicals in crystalline form is the most definite sort of step; a great deal of progress has been made in the past 15 or 16 years. I remember a paper given about that long ago, in which it was reported that some sort of pellagra was cured by the use of dried brewers' yeast. There was a lot of head-shaking in the audience. We do not shake our heads today.

However, I believe there is another 15 years of progress ahead of us. The subject, at present, is so indefinite for most clinicians that we must ask research workers to give us something further. For instance, we are told that the signs of riboflavin deficiency are reddened, cracked lips, sebaceous collections at the alae nasae, and greasy scales on the lid margins, on a hyperemic base. The lid

symptoms are always stated last, and should therefore be least common. Yet, in this climate, I think the characteristic red cracked lips are rare. On the other hand, scales on the lid margins are quite common. In the treatment of this type of blepharitis marginalis, riboflavin is just part of our armamentarium. Nearly always an angular conjunctivitis is also present, and must be treated with the customary zinc sulphate solution: that is, riboflavin by itself is inadequate. I would like to hear Dr. Goldsmith's reaction to this.

Dr. Grace A. Goldsmith (In closing): I agree with Dr. Stanbery that certainly there is a tremendous amount of work still ahead. We are just beginning to scratch the surface, as far as vitamins are concerned. Even the findings related to the eye are still in the primary stage of investigation. Riboflavin therapy will not cure all of the eye conditions mentioned. It will cure a certain number of them and, in conjunction with other measures, will assist in alleviating others. In some instances there is apparently no benefit. In our experience in the eye clinic we have found similar lesions helped at times by vitamin A, at others by riboflavin. There is a great deal more to be learned especially in regard to the interaction of vitamins and the effect of deficiency of one factor on the function of another.

—o—

UNUSUAL INFECTIONS IN THE NEWBORN CAUSED BY *STAPHYLOCOCCUS AUREUS**

RUTH G. ALEMAN, M. D.
NEW ORLEANS

During the past year a number of unusual infections have come under my care, from which I have selected four cases of *Staphylococcus aureus* infection in the newborn to report. The youngest, a premature baby, developed a series of skin abscesses; the second, full term, developed osteomyelitis on the eleventh day of life; the third, nineteen days old, a blood stream infection; and the fourth, three weeks old, peritonitis. Three recovered and one died.

These cases are being reported so as to stress the importance of safeguarding newborn infants from all sources of infection; also, to show the efficacy of chemotherapy, in conjunction with blood transfusions and other supportive measures, and its toleration by the newborn.

*Read before the Orleans Parish Medical Society, May 10, 1943.

Infections in the newborn are by no means new. On the contrary, they have been the curse of hospitals, of institutions and homes as long as there have been doctors to worry about them. In recent years it has been the practice in modern hospitals to lend every effort to the prevention of infection both prenatally and from the instant the baby is born. Immediately at birth he is received aseptically, his cord and eyes are given prophylactic treatment, while the obstetrician has made the greatest effort to prevent trauma to his body which might subsequently become avenues for infection.

The etiologic factors of infection in the newborn are well known. Among them (1) infection may occur in utero; (2) in some cases in the genital tract of the mother; (3) infection from the mother's milk; (4) from any portion of the mucous membrane; (5) any abrasion or wound of the skin; (6) the umbilicus is a common portal of entry. Infection may be a direct result of a lack of aseptic technic during delivery, and it may occur before or after separation of the cord.

Organisms most frequently encountered are staphylococci, streptococci, pneumococci, and members of the colon group. Gonococci, *B. pyocyaneus* or other organisms are occasionally found.

PATHOLOGY

If the infection is from the umbilicus, the process may involve only the region immediately surrounding the umbilicus; often, however, it extends along the regional vessels in the vicinity in widespread suppuration. Peritonitis may occur, or other infections anywhere in the body. Any one or all of the serous membranes may become involved. Suppuration of the bones or joints is frequent. Erysipelas is exceedingly common. The main difference in the septic processes of the newborn and those seen later in life is the multiplicity of infections which may be found in the same patient; peritonitis, pneumonia, pericarditis and empyema have all been found in the same infant.

Sepsis of the newborn must be looked upon as a preventable infection, both from the obstetric point of view and the after care, the proper care of the cord, the eyes and the body of the baby generally, especially the umbilicus and any trauma the baby may have sustained in delivery.

Antistaphylococcic immunity is a complex clinical problem which seems in early life to depend on maternal immunity and in later life on previous infections. And this immunity is no doubt conserved in different degrees in relation to constitution, environment, or other determining factors.

It has been found by Bentivoglio and Moschini[1] that the amount of antistaphylococcic toxin in the blood serum of the newborn is always identical with that of the mother. Following exhaustive studies, these authors concluded that in newborns this passive immunity of maternal origin diminishes rapidly and is finally exhausted two or three months after birth. On the other hand, in nurslings and in infants of all ages there may exist a certain degree of antistaphylococcic immunity which can be determined in the majority of cases by the presence in the serum of certain quantities of staphylococcic antitoxin. The naturally acquired antistaphylococcic immunity seems to be the result of previous contagions or infections of the specific agent which has been more or less hidden (staphylococcic antigens).

CASE No. 1

Staphylococcus aureus skin asbscesses were observed in a permature baby boy, born at Hotel Dieu, January 23, 1943, and discharged on recovery, March 10, 1943.

Baby McL., a premature baby boy, seven months' gestation, was delivered normally, in asphyxia, weighing 4 pounds, 11 ounces. He was found with one congenital abnormality, namely, hypospadius.

The baby was put in an incubator, given vitamin K and oxygen continuously. He did rather badly, having intermittent attacks of cyanosis, and was kept under oxygen tent for four days. On the fourth day of life he developed an abscess over the right scapula at the site of a needle puncture for clysis, elevation of temperature to 104° F., and leukocytosis of 23,250. The abscess was incised and drained, a culture showing *Staphylococcus aureus.*

He became deeply jaundiced and remained so for a week's time, and was extremely ill during the three following weeks. On the twenty-eighth day of life another abscess in the right mid-axillary line was incised and a large amount of pus extracted. Seven days later a third abscess on the left buttock was also incised and drained. The baby had a very stormy time but made a nice recovery, and when discharged from the hospital at six weeks of age, weighed five pounds.

Treatment: The baby was given supportive treatment with Ringer's solution and glucose clyses and four transfusions during the first month of life. When the infection made its appearance sulfadiazine therapy was instituted and continued. The drug was given internally and applied in the incisions. Breast milk was given throughout.

This case is unusual because of its early onset, its severity and recovery in a premature baby. The blood changes in this case were essentially the same as those reported in a similar infection by Roy M. Greenthal in 1936.[2]

CASE No. 2

Peritonitis in a three weeks' old baby with recovery. Admitted to Hotel Dieu October 29, 1942, and discharged December 12, 1942.

I first saw Baby L. A. at home during her third week of life, two days after the abdomen had begun to swell. Delivery had been normal and there was no history of previous illness. The weight at birth was 7 pounds, 11 ounces. The baby was a well developed and well nourished newborn girl wth marked distention and tenseness of the abdomen, showing an area of redness about two inches long at the right of the umbilicus. The umbilicus had apparently healed. Temperature was 102° F, otherwise physical examination was negative. My first impression was intestinal obstruction, but, upon investigation, found the baby taking her feedings normally without vomiting, and passing normal stools. A tentative diagnosis of intra-abdominal infection, probably peritonitis, was made. The mother at the time had a draining infection in her breast,—a culture from which showed *Staphylococcus aureus.*

Sulfadiazine was given by vein immediately on admission and subsequently continued by mouth, being given in doses of one grain per pound of body weight per 24 hours. The drug was discontinued only once for 24 hours during the baby's entire stay in the hospital, and continued to within two days of discharge.

Two days after admission a surgical consultant was called who advised operation, believing the condition to be intestinal obstruction. A right rectus incision was made, and upon opening the peritoneal cavity a great quantity of thick, fibrinous, yellowish exudate was found, without any

evidence of obstruction. Sulfathiazole powder (4 grams) was placed in the abdominal cavity and the incision closed without drainage. A culture was made which showed *Staphylococcus aureus*, and it is my opinion that the route of entrance to the baby was through the umbilicus from the mother's breast infection.

After operation the temperature remained high, ranging from 101°-103° F. for two weeks, and then gradually decreased until it finally become normal before discharge.

On the seventh postoperative day a small mass appeared midway between the xiphoid process and the umbilicus. This suppurated and drained spontaneously, healing without surgical interference. Eleven days after operation, bronchopneumonia developed and further endangered the baby's life. Following this, another infection occurred below the right scapula, which necessitated surgical drainage.

Treatment: In addition to chemotherapy, the treatment included blood transfusions, sterile breast milk, clyses, vitamin C in large doses, and vitamins D, A and B. She was given 30 to 60 c.c. of blood transfusion about every third day from the date of admission to within ten days of discharge, that is, twelve in all.

At the time of discharge, the baby's general condition was good, she was free of fever, the pneumonia had cleared entirely, and all suppurating processes had healed. The total white blood count remained high during her entire illness, being as high as 33,000 when pneumonia complicated the picture, and finally, on discharge, going down to 10,250.

In spite of the long continuance of sulfonamide therapy, the blood at no time showed agranulocytosis or hemolytic anemia. The urine was normal throughout except for the appearance of large quantities of sulfa crystals, at which time the drug was withheld for 24 hours.

This baby has progressed as any normal infant should. She sat up at five and a half months. She is now seven months old and weighs 19 pounds, 5 ounces.

CASE No. 3

Blood stream infection caused by *Staphylococcus aureus*, admitted to Hotel Dieu September 10, 1942, expired October 2, 1942.

Baby D. D., a girl weighing 6 pounds, 2 ounces at birth, was delivered normally at full term, and breathed spontaneously. The mother had an infected finger during the puerperium and for a few days the baby was not allowed to come to breast for fear of infection. So far as the mother knew, the baby was normal during her hospital stay, except for a rather large abrasion on each heel. These were apparently rather deep, since the gauze which protected each had to be soaked before removal could be accomplished.

I first saw Baby D. at home when 19 days old and advised immediate hospitalization. She was admitted with a history of fever, semi-coma and diarrhea of two days' duration. Her temperature was 102° F. The general impression was that of an acutely ill baby, whose physical examination was negative except for slight distention of the abdomen and a spleen palpated just below the costal arch.

Blood cultures made the day of admission and subsequently showed *Staphylococcus aureus*. Repeated agglutinations for the common fevers were all negative, nor was malaria found. We persisted in our blood studies because the baby's physical examination was essentially negative until a short time before death. Eighteen days after treatment had been instituted, the culture became negative and remained so as late as four days before death. Wassermann and Kahn tests on both baby and mother were negative. Stools and urine were repeatedly negative.

On the day of admission the white cell blood count was 9,250, neutrophiles 78 per cent, lymphocytes 20 per cent. Frequent blood counts showed leukocytosis from 15,000 to 21,000 with a high polymorphonuclear count on all occasions.

The temperature curve was of septic type, ranging from 97°-104° F.

The baby seemed to be improving until the nineteenth day, when she developed nystagmus and spasticity of the arms, with hyperactive reflexes. Her pulse was irregular, respiration labored, and she became extremely pale. On the twenty-second day she expired.

Spinal tap was done on two successive days when central nervous system symptoms developed. There was nothing characteristic about the fluid except that in a culture of each, *Staphylococcus aureus* was present.

Treatment: On admission, thinking we were dealing with diarrhea, sulfaguanadine was given, but when diagnosis of blood stream infection was established, this was changed to sulfadiazine and continued. Blood transfusions were given every four days. The baby was fed breast milk during her entire illness.

CASE No. 4

Osteomyelitis of the left femur caused by *Staphylococcus aureus* in an eleven day old baby, with recovery. Born at Hotel Dieu, March 3, 1943, discharged April 22, 1943.

Baby M., a boy, delivered by cesarean section at full term, was normal at birth, weighing 6 pounds, 10 ounces. When seen by me two days after birth, the baby was normal except for two small abrasions resembling needle scratches on the left external malleolus.

He made normal progress until the eleventh day after birth, when he developed fever of unknown origin (101.8° F.), which continued without localizing symptoms for four days. The abrasions

on the foot, while still present, were not visibly infected. Sulfadiazine therapy was instituted.

Slight generalized swelling in the left extremity became apparent on the fourth day of illness, becoming more marked each day. A uniform swelling showed in the entire left lower extremity above and below the knee. After ten days this localized above the joint anteriorly, where a fluctuating mass was palpable. The total white cell count was 24,000.

A surgical consultation was held at the time and an x-ray showed "Periosteal reaction in the distal end of the left femur due to osteomyelitis." Another x-ray report (six days later) read, "Previously reported osteomyelitis distal end of left femur shows considerably more periosteal reaction than at previous examination. There is some destruction in the shaft of the femur."

An incision was made by the surgeon immediately over the distal end of the femur without entering the bone. Pus, which was readily found, was drained. Drainage continued for twenty days. Culture showed *Staphylococcus aureus*.

An orthopedist placed the leg in a posterior plaster splint which has been repeatedly changed in order to prevent fixation of a 90 degree knee angulation.

The baby was never extremely ill. The highest temperature was 102.4° F., reached on one day only. The total white blood count was 29,000 just before operation, dropping to 17,000 when drainage was instituted. The urine remained normal. He was discharged on the fifty-first day of life in very good condition, there being no further drainage from the incision, and very little remaining angulation.

Treatment: As stated above, sulfadiazine therapy was instituted at the appearance of infection. This was continued until four days after surgical drainage had been established. Sulfathiazole powder was applied to the wound. The baby was given two blood transfusions, large doses of vitamins, and breast milk.

The findings, treatment and results in this case conform almost exactly with a similar case summarized in March of this year by W. T. Green,[3] of the faculty of Harvard University, who has made several reports of his experience with osteomyelitis in infants treated at the Children's Hospital of Boston. A few quotations from his articles bring out the salient features to be considered in dealing with osteomyelitis in young infants: "Swelling is more diffuse in infants than in those older" (1943). "At operation it is not necessary to carry out a procedure on the bone if the secondary abscess is adequately drained" (1935). "Chemotherapy has assisted greatly in the care of these patients and should be instituted from the start" (1943).

Samuel Stone,[4] of New York, (1942) reporting four cases of osteomyelitis in the newborn treated at Bellevue Hospital, found, as we have, that "there are few reports of osteomyelitis of the long bones in the newborn;" also, "Osteomyelitis in the newborn child appears to be a benign disease; but when it is a manifestation of sepsis, the prognosis is more grave and depends on the severity of the septic process."

REMARKS

There is little doubt that the remarkable recovery of three of the infections here reported was due to sulfonamide drug therapy. Other important factors are early diagnosis, accurate bacteriologic diagnosis, correct nutrition, which often requires careful administration of intravenous fluids to correct disturbances in water and electrolyte metabolism, transfusion,—and last but by no means least, surgical procedures which may be of equal or even greater importance.

INCIDENCE IN CHARITY HOSPITAL

A survey of the records of the New Orleans Charity Hospital for a period of five years and ten months, beginning July 1, 1937, and ending May 1, of this year (1943), shows that a total of 29,575 newborn infants were treated in the hospital.

Osteomyelitis: If any ostemyelitis occurred among newborn infants during this period, the information is not on file in the Record Library. Mahorner's[5] exhaustive study of osteomyelitis in the same institution through 1940, also failed to show any cases of osteomyelitis in the newborn.

Abscesses: Fourteen newborn infants developed abscesses in various locations of the body surface, or one in every 2,112 newborns treated. In five of the nine recoveries the abscesses were located on the breast (one case bilateral), one on the cheek, one in the perianal region, one at the unspecified site of a hypodermic injection. One case of scalp abscess, although complicated with septicemia, recovered. Another case

of scalp abscess, complicated with bronchopneumonia, died. The other four deaths included: abscesses of the back, with pneumonia; abscess of the thigh, with septicemia; abscess of the axilla with septicemia; abscesses of wrist and testicle, with septicemia, periontitis and bronchopneumonia.

Septicemia: Strange to say, there were also 14 cases of septicemia in the newborn, an incidence in the abscess group, of one in 2,112 newborns treated in the hospital. Thirteen died, a mortality of 93 per cent. The cured case, mentioned above, was one of scalp abscess and septicemia.

Peritonitis: There were 15 cases of peritonitis in the newborn, all of whom died. Ten of these babies were operated on for congenital malformations, including evisceration of intestines in five cases. The remaining five babies in this group, whose peritonitis had no connection with a postoperative status, represent an incidence of one in 4,915 newborns in the Charity Hospital from July 1, 1937 to May 1, 1943. Only one was diagnosed as caused by staphylococcus.

There was an overlapping of groups in five cases. Four newborns each had two of the infections with which this report is concerned, and another, three; abscess and septicemia in two fatal cases; abscess and septicemia in one cured case; septicemia and peritonitis in a fatal case; abscesses, septicemia, and peritonitis, as well as bronchopneumonia all in one baby who died on the seventeenth day of life. Such multiplicity of infections is characteristic of the newborn.

SUMMARY AND CONCLUSIONS

Four cases of *Staphylococcus aureus* infection in the newborn have been reported from my private practice in the last seven months: one case of skin abscesses on the fourth day of life, one case of osteomyelitis of the left femur on the eleventh day of life, a blood stream infection at nineteen days of age, and peritonitis in a newborn three weeks old.

In each case a sulfonamide drug was administered by vein, by mouth, or in the wound. In no case was there agranulocytosis or hemolytic anemia. There were no renal complications in any of the cases.

In addition to chemotherapy, each newborn was given repeated small blood transfusions, was fed breast milk and vitamins A, B, C, and D.

One of the four cases failed to respond to treatment, the blood stream infection, which terminated fatally on the twenty-fourth day of illness.

These cases illustrate the value of chemotherapy when administered in conjunction with supportive treatment and surgery when indicated.

They also emphasize the necessity of safeguarding newborn infants from all sources of infection.

REFERENCES

1. Bentivoglio, G. C., and Moschini, S.: Natural anti-staphylococcic immunity in nurslings and infants, Lattante, 8: 107, 1937.

2. Greenthal, Roy M.: The hematology of sepsis of the newborn, Arch. Pediat., 53: 583, 1936.

3. Green, W. T.: Osteomyelitis in infancy, J. A. M. A., 105: 1835, 1935; Green, W. T., and Shannon, J. G.: Osteomyelitis of infants: Disease different from osteomyelitis of older children, Arch. of Surg., 32:462, 1936; Green, W. T.: Orthopedic problems of infancy, Connecticut State M. J., 7:227, 1943.

4. Stone, Samuel: Osteomyelitis of the long bones in the newborn, Am. J. Dis. Children, 64: 680, 1942.

5. Mahorner, Howard, and Crain, Alfred P. Jr.: Acute hematogenous osteomyelitis, Ann. Surg., 115: 790, 1942.

DISCUSSION

Dr. Rena Crawford (New Orleans): I should like to thank Dr. Aleman for bringing these interesting cases to our attention and congratulate her on the marvelous success she had in treatment of these cases; also on the early diagnosis and the work she did on them.

I read an article by Dr. Dunham which some may remember, some eight or ten years ago in the Journal of Pediatrics, in which she summarized the blood stream infections in 39 cases in five years, in the New Haven Hospital. This group of 39 cases had positive blood culture. It was suggested in that paper that if more cultures were taken on the newborn, diagnosis could be made of some obscure diseases which are otherwise missed. Of these 39 cases she reported, before the days of sulfonamides, 30 cases were lost out of the number. Of the 39 cases, 30 of them showed localized lesions and 19 had cutaneous lesions. There were seven lesions from the umbilicus. An interesting thing was that out of seven umbilical infections only three of them were diagnosed clinically and the others were found out at autopsy. There were four cases of osteomyelitis, several

cases of peritonitis and, as I said, most of them died.

About two years ago, at Baptist Hospital, I saw a case of peritonitis. Dr. Stewart and I have this case ready for publication. I was not so fortunate as Dr. Aleman. I saw the baby when 18 hours old and the only thing wrong I could see was distention and failure of bowels to move. There was no fever. No x-ray was made. I thought there was intestinal obstruction and suggested an exploratory investigation. The infant died four hours later. At autopsy it was found that there was ruptured intestinal ulcer about two inches above the cecum. The mother had a normal pregnancy and delivery but the child had an ulcer and died from it.

Dr. Suzanne Schaefer (New Orleans): A discussion of infections of the newborn is of special interest and value at this time. As all of us know, from unfortunate experience, they are more frequent than they have been, and we may expect them to become even more frequent than they are now. The explanation is simple. Our nurseries are overcrowded, our nursing facilities are limited, and both conditions, as the emergency continues, are likely to become even more aggravated than they are at the present time.

For reasons not yet entirely clear, newborn babies are peculiarly susceptible to pyogenic infection, no matter how adequate prenatal maternal care has been, and protection from environmental risks is essential. The strict regulations which have been devised for the nursery regimen are based on a sound rationale, and their observance is extremely important. I am frank in saying that epidemics of infection are not, as a rule, the fault of the nursing staff. All too often they can be traced to some break in technic, often a minor break but nonetheless potentially dangerous, on the part of the attending staff. How easily a minor infection in a single infant becomes a major epidemic with tragic consequences is another event that is also unfortunately well known to us all.

So far as I can determine from a casual review of the literature, less than a dozen cases of osteomyelitis of the newborn are on record. I have never personally seen a case. Under proper management the disease runs a relatively benign course, in contrast to the stormy and chronic course of the same disease in older children and in adults. Osseous lesions and surgical wounds heal rapidly, sinus-formation is readily controlled, and new bone formation is prompt and adequate. The literature suggests, I am sure correctly, that diagnosis is difficult and likely to be overlooked, and Dr. Aleman is to be congratulated on her recognition of the case she has reported.

Another serious disease in newborn children is so-called infectious diarrhea, which is now generally believed to be a manifestation of general sepsis. Autopsy studies have shown the same pyogenic organism as is found in the gastrointestinal tract, to be present in the respiratory tract, the heart valves, and muscle, and elsewhere in the body, and it is logical to assume that the condition is a primary sepsis rather than that the diarrhea is primary. The mode of dissemination is not yet understood, but the strict isolation of any child with diarrhea is essential to prevent the spread of the disease.

The sulfonamide drugs have revolutionized the management and reduced the mortality of infectious conditions in the newborn, just as in older patients. Impetigo neonatorum and infected forceps abrasions are instances. Formerly such infections were treated by ammoniated mercury, gentian violet and silver nitrate. They were usually controlled, it is true, by these methods, but the course was two weeks or longer. Now by the use of sulfathiazole ointment the course is usually five or six days or even less. Reports on the treatment of more severe rare infections, such as Dr. Aleman has reported, are just beginning to appear in the literature, but there seems little doubt that equally as good results can be expected in them as have been achieved by these methods in the minor infections and in pneumonia.

Finally, I should like to emphasize again that the first principle of both diagnosis and treatment in very young babies is constant observation, based on the realization that in the very young, just as in the very old, the clinical manifestations of any disease are likely to differ materially from the classical picture. The condition of a child with high fever, who is vomiting and diarrheic, is not likely to be overlooked. A child with moderate fever or subnormal temperature, with no gastrointestinal disturbances, who is quiet and apathetic, may be much more seriously ill, and may even die within an incredibly short period, before the fact of his illness, let alone its grave character, is comprehended. Eternal vigilance, in other words, is the price of salvation in the newly born child.

Dr. L. A. Fortier (New Orleans): I would like to congratulate Dr. Aleman on this excellent paper and to discuss the osteomyelitis case. I had the pleasure of seeing the case with Dr. Aleman and Dr. Planche at Hotel Dieu. There was definitely periostitis shown on the x-ray film and we were a little dubious about osteomyelitis at first because it is so rare in children at that age. Aspiration was done, pus found and drain instituted. A few days later the bone changes were very much more marked and definite osteomyelitis was present.

Dr. W. S. Sako (New Orleans): I have been interested in infections for several years. Some time ago in conjunction with the pediatric department, I had the opportunity to study the blood stream of patients admitted for various infec-

tions, taking cultures in order to study the staphylococcus organism. We found that the staphylococcus was a dangerous organism and a very frequent cause of infection. All too often presumption is made that the culture is contaminated and the diagnosis is missed. I have seen cases in which the blood culture has stayed positive in children and adults for several years, and yet the patient remains well for various intervals of time. Then suddenly osteomyelitis breaks out or there is a localized infection. This shows that the staphylococcus can invade the blood stream and remain months and possibly years before the infection is localized or causes symptoms.

Another thing with which one who works with the staphylococcus becomes aware is the fact that many of these strains of organism can produce potent toxin. This was demonstrated to me some years ago when a technician working in a laboratory was scratched on the end of the finger by a rabbit and died within six hours. Three hours before death, the blood culture showed hemolytic staphylococcus. This strain of organism produced a potent toxin, causing death in animals and giving rise to antitoxin.

Since Dr. Aleman has had excellent results with sulfadiazine alone, I would hesitate to recommend any other therapy. However, the administration of antitoxin in these cases merits consideration. Sometimes remarkable results are obtained. A year ago there was a newborn in the Charity Hospital who developed staphylococcus septicemia with osteomyelitis. This baby was very ill and prostrated. Antitoxin was administered and the patient's response was dramatic. Chemotherapy was also used and recovery took place.

Another thing to consider in Dr. Aleman's therapy is whether or not to select thiazole or diazine. It appears that sulfathiazole is superior against staphylococcus in smaller concentrations, up to 5 mg. per cent. When one reaches a concentration of 10 mg. per cent or above, sulfadiazine is just as efficacious. One case I know of in the Charity Hospital with staphylococcus septicemia was given 18 grams of sulfathiazole in 24 hours. The blood level was only 5 mg. per cent. We changed to sulfadiazine and maintained a higher blood concentration with better results. The patient recovered from the septicemia and now has a localized infection in the arm.

Dr. C. A. Stewart (New Orleans): This report of four cases of serious illness in infants with 75 per cent recovery records a remarkable accomplishment. These infants could not have been in better hands.

In a recent conversation I learned that combining urea with sulfonamides was greatly beneficial in the treatment of empyema. This recalls to my mind an article in Science to the effect that the inhibiting influence of para-aminobenzoic acid can be diminished by administering urea in conjunction with sulfonamides. This suggests that urea may be used in the future to augment the beneficial effects of various sulfonamides. Not long ago the treatment of septicemia was limited largely to transfusions, but recently arsenicals, staphylococcus antitoxin, and sulfonamides have been added to the therapy with improved results.

WARREN STONE*

ROBERT GLENN ALLEN
NEW ORLEANS

The name of Warren Stone, an able and beloved teacher in the Medical College of Louisiana from its first session in 1834 until his retirement from active life in 1872, was known throughout the South for almost half a century. As professor of surgery for 35 years, and as surgeon to Charity Hospital for 39 years, Dr. Stone's name is impressed indelibly upon the local history of a remarkable era.

Warren Stone was born at St. Albans, Vermont, on February 3, 1808. He was the youngest of the three children of Peter Stone, a farmer, and Jerusha Snow, a remarkable woman, who undoubtedly was largely responsible for her son's greatness and success. The father died before his son was born, but his mother outlived him, being past 90 when she passed away. His youth was spent very happily on a New England farm far from the nearest school, so the greater part of his early education was received from his mother This teaching aided him greatly in preparing for the study of medicine, the profession he had chosen in his early youth. His mother encouraged him, and she left no stone unturned in preparing her son for his future training and in seeing to it that he received the best possible medical education. Dr. Stone realized how much his mother had done for him, and in all the years they were separated he kept up his correspondence with her. When he was a sick, old man he made the long journey North to see his mother once more before he died.

After his early training at the hands of his mother, he went to Keene, New Hampshire, to become the private pupil of Dr.

*Read before the History of Medicine Society, Tulane University, February 26, 1943.

Amos Twitchell, who won Warren Stone's affection and imbued him with a special fondness for surgery. He then entered Medical School at Pittsfield, Massachusetts, and in December, 1831, he received his degree.

In 1832, Dr. Stone, then 24 years old, located in West Troy, New York, where he began the practice of medicine. It was in this year that the dread cholera first appeared on this continent among the immigrants in Quebec and Montreal. These immigrants started for the States, as it seems do all people in distress. Early in July several cases of cholera occurred in West Troy, and to the first of these cases Dr. Stone was called late at night. He promptly recognized the new disease. Not many days later the following case occurred, which was narrated by him 35 years afterward in support of an argument against the contagious nature of cholera: "A humane person requested me to see a young man, lying in a pile of lumber, who, he said, appeared very ill. I found him in the collapsed state of cholera. As he was destitute, I obtained an outhouse of the landlord and had him conveyed to it, and stayed with him the greater part of the time for 24 hours, administering his medicines, and even injecting a saline mixture into a vein in his arm. The room was close, but I suffered no inconvenience from contact and confinement." Even though this case was related to prove a controversial point, it will illustrate that philanthropy which was always a foremost principle in his profession and private life.

In the latter part of October in 1832, Dr. Stone left West Troy and turned to the South for his future home. When he embarked in the brig Amelia for New Orleans, there were very few cases of cholera in New York. The ship was overcrowded with passengers, and carried a valuable cargo. The story of the voyage is interesting but tragic. Here is the log in Dr. Stone's own words: "For the first four days there was a calm, and everything was healthy; but a terrible storm came, and it was found necessary to fasten down the hatches and stifle over one hundred beings in a small space between a small ship's decks. I expected serious consequences. The captain, who was willing to do whatever was proper, said that the hatches could not be raised without imminent danger of sinking the ship, a fact which was subsequently verified. On the third day of the storm there was a cry that there was a man dead below. The weather having moderated a little, found a deplorable state of things. All seemed stupefied from foul air, and about twenty-five seemed to be in the second stage of cholera. At this period in the voyage, on the 30th of October, the brig, in distress, was beached on Folly Island, off Charleston harbor, and there subsequently, by order of the municipal authorities, the vessel and cargo were burned. The terrifying disease of which these unlucky voyagers were suffering spread great alarm, but pity for their misfortune soon became the prevailing feeling."

The owner of Folly Island, a Mr. Milne, opened his house and all the buildings of the island to care for the unfortunate members of the crew and passengers. Charleston responded at once, and sent physicians, provisions, and everything available to provide for the sick. Dr. Stone remained on the island and worked untiringly to relieve the great suffering all about him. In all this misery, one happy event took place. Dr. Stone met Dr. Thomas Hunt, then of Charleston, who had been commissioned by the authorities to take entire control of the sanitary affairs of the plague-stricken island. These two became fast friends, and Dr. Stone was a great aid to Hunt who planned the Medical College of Louisiana, later the University of Louisiana, and now The Tulane University of Louisiana. Soon Dr. Stone was stricken with the disease and Dr. Hunt became his physician.

When the epidemic had abated, the city of Charleston sent the passengers of the ill-fated brig to their original destination.

So in December, 1833, Stone landed on the levee in New Orleans, a friendless stranger with only one picayune in his pocket. Later he remarked to a friend that the only reason he saved this was for the

sake of preserving a nucleus. Evidently he had given his money away.

Eighteen hundred thirty three! This was a memorable year in New Orleans. Yellow fever was declared epidemic on October 15, and ten days later cholera appeared. Here were two terrible diseases, cause unknown, both spreading through the population like wild fire, the desolution of one disease being eclipsed only by the horrors of the other. The official report of the senior surgeon of the Army in New Orleans states that over 10 per cent of the entire population had cholera. The then new Charity Hospital had just been built, and one can imagine how crowded its wards were.

Into this city of dead and dying people stepped Warren Stone. He immediately offered his services to the hospital and was appointed a supernumerary in the medical department. This was the first of many New Orleans epidemics in which Dr. Stone played a prominent part. In August, 1833 Dr. Thomas Hunt, who had moved to New Orleans, became house surgeon, and the friendship that had begun on Folly Island was renewed. Dr. Hunt in a letter to the Board of Administrators of the hospital used the following words to recommend Dr. Stone for promotion: "It gives me great pleasure to state from my personal knowledge that Dr. Stone is a humane and worthy man, and a well-informed, skillful, and for his age, an experienced surgeon. He is in every respect qualified for the office of assistant house surgeon." Dr. Hunt's recommendation was not cast aside, and in due time Stone was appointed assistant house surgeon to serve with Dr. Harrison who had been elected to succeed Dr. Hunt. Hunt wanted to found a medical college in New Orleans, and resigned to devote all his time to that purpose. Dr. Stone served from 1833 to 1835, and when Dr. Harrison resigned in his favor, he was elected house surgeon. When his term expired in 1839, he was elected a visiting surgeon to the hospital, which position he held until he retired from all active work in 1872.

Charles J. Bickham, a ward student under Dr. Stone has the following to say of his instructor: "He was methodical and industrious, quick in perception, and prompt in the execution of what he conceived to be his duty in all cases. His thoughts were rapid, and he seemed always to take in at a glance the whole circumstances and details of a case. This kind of knowledge and ready comprehension as to the true state of things in any case was a peculiar and marked characteristic of the man. It is often called intuition. Call it what you will, Dr. Stone possessed this faculty to a marked degree, and appeared always to be ready for any emergency that might arise.

"His resources were unbounded. He never seemed to be taken unawares. His knowledge, tact and ingenuity were equal to the occasion, and he never appeared so cool, self-possessed and grand in his whole nature, physical, mental and moral, as he did in the midst of sudden and alarming emergencies in surgery. He seemed to rather welcome such occasions, and in the midst of the most complicated and difficult operations, cool, calm, and collected, he would promptly do his duty, at the same time lecturing and explaining to those present the minutest practical details of the case. In truth, every visit to the hospital was an ovation to him, which he acknowledged with becoming modesty, but which served to doubly inspire him; and his entire time at the hospital was one constant discourse upon the various diseases and their treatment to those around him. He seemed to realize his capability and that much was expected of him; yet, withal, he was as modest as a woman and appeared oblivious to his good deeds."

In his clinics, he taught the advanced surgery of the old school. He believed in the principles of drainage in suppurative arthritis, in hepatic abscesses, and in pyothorax. He advocated resection of the rib to facilitate the drainage in suppurative pleuritis. He believed strongly in making free incisions, and did so whether in operative work or in the liberation of pus. In surgery of the arteries, he was an expert, and was among the first to cure an aneurysm of the vertebral artery.

All of Dr. Stone's early work at Charity was done without the aid of an anesthetic, and he was indeed ready to welcome the new era in surgery which was about to dawn. In 1846, Jackson and Morton demonstrated publically the use of ether as a general anesthetic. The news of this discovery was not received with favor universally, and many were openly against it. Yet on February 25, in 1847, Dr. Stone amputated the thigh of a man, using ether anesthesia. The operation was performed in the amphitheater at Charity Hospital. A reporter commented favorably, writing in the newspaper: "The operation was entirely satisfactory to all who witnessed it—a thigh had been amputated without pain." This incident illustrates Dr. Stone's independence of action in all medical matters about which he had definite opinions. Chloroform soon became his preferred anesthetic, and he influenced many others to use it.

One of the earliest private hospitals in the United States was founded in New Orleans by Dr. Stone in connection with Dr. William E. Kennedy. It was called the Maison de Santé, and when Kennedy retired in 1845, Dr. Stone assumed entire control. The institution was managed prosperously by the Sisters of Charity.

Hotel Dieu was founded in 1859, and the Sisters of Charity went there. The old institution became Stone's Infirmary, and though it was a private institution, medical relief was never refused any applicant. After the war with Mexico, returning soldiers were cared for by the hundreds, and you may be sure not many paid for their treatment. Listen to the words Professor T. G. Richardson wrote in 1861: "It is an established rule of the house never to refuse professional services on the score of poverty of the applicant. And in this connection the writer takes the liberty of saying that the charity thus dispensed by his benevolent colleague, Dr. Stone, incalculable in amount, and unostentatious in its bestowal is of itself sufficient to elevate its author to that high rank among philanthropists which his well known abilities have long since commanded in the profession which he adorns."

The infirmary was widely known in its day, but in 1867 its doors were closed and the buildings were torn down.

As Tulane men, we are naturally interested in Dr. Stone's connection with the University, which was the most important part of his professional life and work. In the first session of the school in 1834, he was the acting demonstrator of anatomy, in the place of Dr. J. H. Harrison who was ill. The institution was then known as the Medical College of Louisiana. In 1835-36 he was the demonstrator of anatomy, and in 1836-37, lecturer on anatomy. In 1837 he was the professor of anatomy and lecturer in surgery; from May, 1837 to April, 1839 he was professor of anatomy and surgery, and from April, 1839 until his retirement in April, 1872, he was professor of surgery. What a sudden climb! From acting demonstrator on anatomy at the age of 26 to professor of anatomy and surgery at 29.

Dr. Stone was never a systematic teacher, but usually discussive. In a didactic discourse, he would not follow beaten paths; some topic of the day or a recent case he had seen or read of would be the subject of the lecture. Whatever the subject, his discourses were always instructive. His manner as a teacher was earnest and direct, and he held the esteem of his students.

In his travels to Northern and Eastern cities, he occasionally lectured by invitation before medical classes. His topic was usually yellow fever, since it was such an important factor in the South.

Dr. Stone did not like to write. It is said that he realized what a handicap his meager pre-medical education was, though it was the best his mother could give him under the circumstances. The following letter illustrates his disinclination to write. It is taken from the New Orleans Medical and Surgical Journal, 1859.

August 29, 1859.

Mr. Editor:

According to promise, I herewith send you a small contribution, which I fear you will think hardly worth publishing. I have

undertaken to give some of my impressions upon an important subject (inflammation), and my method of analyzing it, but find that I have totally failed. I know I have observed much and honestly, but with no object except to learn the right use of medicine; but although my convictions, to me, have all the force of facts, when I come to put them to paper I feel myself in the condition of an ancient philosopher, who, to a difficult question, answered, "If you don't ask me I know, but if you ask me I can not tell." However, good or bad, publish it, and I will continue the subject and try to make something intelligent on the subject of treatment or application of therapeutic agents to pathological conditions.

Very truly, your friend,
Warren Stone.

His most important article entitled "Ligation of the Common Iliac Artery; Use of the Silver Ligature," was published in 1852. In it he states that the silver ligature is preferred because of its "innocuous character."

In 1858 he wrote "Observations on Hernia and Obstruction in the Bowel." The article was published in the New Orleans Medical and Surgical Journal. He wrote, "The bowel is in danger from the moment it is strangulated, and should be relieved as soon as possible."

In 1859-60 he wrote the series of articles on inflammation already referred to. He insisted on the necessity of modifying the treatment of disease according to varying pathologic states, and he stated very clearly the conception of the difference in the process by which a clean wound heals primarily, and the true inflammatory process. In his ward teaching and lectures he devoted much time to the subject of inflammation. He believed in venesection in the treatment of inflammation "under certain conditions." There were many others at that time who entertained the same view, so he was not alone in clinging to an old method of treatment. Let it be said, however, that he was a judicious bleeder.

His article "Union by the First Intention and Purulent Absorption" published in 1860 contrasted the American and French methods of treating wounds. The French had one method, and they stuck to it. So it was for the Americans—they would use only one method of treatment—their own. The logical thing to do, according to Dr. Stone, is to use both methods, the French when circumstances indicated it, and the American when other conditions existed. He was a practical man.

His articles were not all confined to surgical subjects. Pulmonary tuberculosis, cholera, and yellow fever were other topics about which he reluctantly wrote, usually at the insistence of his friends.

In spite of his disinclination to write, he was editor of the New Orleans Medical and Surgical Journal from 1857 to 1859 and co-editor from 1859 to 1868.

He was well informed in the medical literature of the day, and in his travels both here and in Europe he discussed medical problems with the most eminent men of his times.

It is said that he was a most distinguished diagnostician before the days of instrumental precision. His colleagues marvelled at the accuracy of his observations.

One of Dr. Stone's greatest virtues was his respect for his colleagues. He was gentle and considerate, and would not allow criticism of others when he was present.

Professor Samuel D. Gross called him the "great common in medicine." He liked the lowly as well as the upper class. He preferred a laborer, if intelligent, to a gentleman, if stupid. When he died, the district courts were adjourned as a mark of respect, flags of the shipping stood at half mast, and many of the stores on the main streets were closed at the time of the funeral.

Dr. Stone was a man of unusual wit. If he walked into a club or public gathering with one or two other men, he soon had them laughing heartily at his jokes and clever remarks. Others would draw near to discover what the attraction was, and soon the entire crowd would be around Stone listening to his witty remarks and filling the rooms with laughter.

Men marveled at his intellectual power. Here is what Dr. Stanford E. Chaillé wrote soon after Dr. Stone's death: "It has been my good fortune to have personally known many of the most distinguished men of my time—statesmen and political leaders, soldiers and preachers, lawyers and doctors, and I testify that of all these great and famous men not one of them impressed me as having been endowed by nature with intellectual power equal to that of Dr. Stone."

In spite of having been born and reared in the North, Dr. Stone was a staunch Democrat and an ardent believer in the Confederacy. He was a personal friend of Jefferson Davis and helped "The Cause" in every possible way. However, on no occasion did he condemn others because they did not see eye to eye with him. For instance, he was a great admirer of and often quoted Daniel Webster, who was a Whig. One day a friend asked, "Dr., how is it that you, a Democrat, can admire Mr. Webster so much?" Dr. Stone replied immediately, "What on earth have my politics to do with my ardent admiration for Webster's great talent?"

He was an accurate and keen observer, whose knowledge of anatomy was superb. He once remarked that people who learned their anatomy from plates and wax models should operate only on the same. Those who knew him said that he was neither a quick nor graceful operator, but was safe and sure.

In the spring of 1872, owing to his failing health, he retired from all active duty. He went North to Vermont to visit his mother. In he autumn he returned to New Orleans suffering from the then incurable diabetes mellitus, and died in his home on December 6, at the age of 64 years.

With the rites of the Catholic Church, the remains were put away in the Cypress Grove Cemetery outside the city of New Orleans.

NEW ORLEANS
Medical and Surgical Journal

Established 1844

Published by the Louisiana State Medical Society under the jurisdiction of the following named Journal Committee:

C. C. deGravelles, M. D., Ex officio
For one year: Lucien A. LeDoux, M. D., Chairman
H. W. Kostmayer, M. D., Secretary
For two years: James K. Howles, M. D.
For three years: G. C. Anderson, M. D., Vice-Chairman
Leon J. Menville, M. D.

EDITORIAL STAFF

John H. Musser, M. D.....*Editor-in-Chief*
Willard R. Wirth, M. D.....*Editor*
Daniel J. Murphy, M. D.....*Associate Editor*

COLLABORATORS—COUNCILORS
Edwin L. Zander, M. D.
J. T. O'Ferrall, M. D.
Guy R. Jones, M. D.
T. B. Tooke, Sr., M. D.
George Wright, M. D.
Rhett McMahon, M. D.
C. A. Martin, M. D.
W. F. Couvillion, M. D.

Paul T. Talbot, M. D.....*General Manager*
1430 Tulane Avenue

SUBSCRIPTION TERMS: $3.00 per year in advance, postage paid, for the United States; $3.50 per year for all foreign countries belonging to the Postal Union.

News material for publication should be received not later than the eighteenth of the month preceding publication. Orders for reprints must be sent in duplicate when returning galley proof.

Manuscripts should be addressed to the Editor, 1430 Tulane Avenue, New Orleans, La.

THE JOURNAL *does not hold itself responsible for statements made by any contributor.*

THE WAGNER-MURRAY BILL

It might be truly said that the opposition to Senate Bill 1161 of Senator Wagner of New York and Senator Murray of Montana, has aroused not only the medical profession but the small business man, the economist and people interested in the welfare of this country.

An editorial in the New Orleans States of October 13, under the caption "Cradle to Grave" discusses this particular Bill not only from the point of view of the doctor but from that of an observer who very definitely is opposed to the establishment of another bureaucracy. The editorial points out that the man in charge of the bureau would have huge amounts of money to spend, wield enormous political and social influence. There would be created an ever growing nest of bureaucrats who would hold great power over a large part of the population of this country.

Medical care and hospital service that the Bill would set up would demand the socialization of the greater part of private medical practice. The editor further states that socialized medicine has had very scant support in this country. Few favor it, practically none understand what it means and what it implies. It would interfere with one of the most precious freedoms of the American people; it would interfere with the actions of one profession, although the engineer, the chemist, the lawyer, the accountant would continue in his private practice, distributing services for that which their talents would command. The doctor, the editorial said, would have to knuckle down to bureaucrats fixing his remuneration, hours of working, working conditions and so on, all from the fountainhead of the huge bureaucracy which would have to be established.

This editorial in one place facetiously asks why the undertaker's service is not included in view of the fact that the provisions of the Bill cover the individual from the time he is born until he dies. The verbiage of this editorial has been followed very closely but it might not be amiss to quote the exact words of the final two paragraphs which say that "When Senate Bill 1161 is called up for action, the people will want to be on their toes. The way to kill that grandiose, extravagant scheme is to see that each member of Congress hears from his constituents. This is a matter that the whole people should vote upon. It should not be permitted to go on the statute books while large numbers of voters are away fighting for their country, as prohibition was foisted on the people. The voters can cast their "ballots" indirectly by writing their senators and congressmen.

Don't get the notion that your congressman is going to ignore a letter or telegram you may send him stating how you stand with respect to any piece of legislation. He will rarely go against the wishes of his constituents.

"If you do not feel like writing your senator or representative today, be prepared to do it when Senate Bill 1161 is called up."

THE ANNUAL MEETING

A decision has not as yet been reached by the Executive Committee as to whether or not the State Medical Society will conduct an annual meeting with the presentation of scientific papers as well as the business sessions of the House of Delegates. Last year, it will be recalled, the meeting was solely for the transaction of business and at Baton Rouge met the members of the House of Delegates and a few other members of the organization who were interested in the business of the Society.

In common with a fairly considerable number of states, our State Society did not hold a scientific meeting. The experience of these states that did hold such meetings, points rather definitely to the conclusion that while the attendance might not be quite as large as usual due to the many men being in the service, nevertheless a reasonably good attendance was the rule everywhere; nor is this experience unusual. The Southern Medical Association had a goodly number of doctors attending their meeting. The graduate assemblies which are held throughout this country have had large turnouts. As a matter of fact the New Orleans Graduate Medical Assembly had a larger registration by far than ever before. It is to be hoped that the Executive Committee may see its way clear, in view of the knowledge obtained by the attendance at other meetings, that this year the annual convocation will be held in New Orleans.

There are several reasons why the State Society meeting would be held. One of the really important reasons for the meeting is that it will enable the doctor, who is now laboring under forced pressure and to a degree which is almost unbelievable, to get away for a few days of rest and the exigencies of practice. It will give him a breathing spell, as it were, and allow him to come back refreshed and revived by his change of environment and through the contact with his fellow practitioners. Another advantage of holding an annual meeting is that the doctor will have the opportunity of becoming acquainted with new ideas and to brush up on his knowledge of medicine in all its aspects. Lastly, it might be pointed out that there are innumerable doctors in the armed forces stationed near New Orleans and throughout the State of Louisiana who could advantageously attend the meeting as guests of the State Society. All in all it is our belief that scientific meetings, except on a very large and grandiose scale and which are attended by thousands of men, should be continued. Officials in charge of transportation have requested that these very large meetings not be held on account of the difficulty of travel but on the other hand they have encouraged the small meetings so that scientific interest in medicine might not be entirely abolished during the war.

THE TREATMENT OF RESPIRATORY TRACT INFECTIONS IN CHILDREN

The respiratory tract infections, from the common cold to pneumonia, are the commonest disorders as a group that are treated by the practicing physician. Many statistics have been prepared which confirm this statement. In adults, respiratory tract infections are responsible to a greater degree for morbidity than any other cause of sickness. This results in a tremendous loss of time from work, disturbs the care of the house and the children in the instance of the mother, as well as sometimes producing permanent anatomic damage or causing death. In youth there is a greater degree of absenteeism from school as result of these infections than any other one cause. Particularly severe may be the infections in childhood because while the average adult or young person is able successfully to combat infection, in the small children

and in infants these infections may terminate in death.

Janeway,* assistant professor of pediatrics at Harvard Medical School, discusses the use of the sulfonamides in infections of the breathing passages of children. He predicates his remarks with the statement that sulfonamide drugs should not be used indiscriminately but that it is extremely difficult to know just what type of infection the doctor is dealing with who treats children in their homes. He says he can hardly blame doctors for using these drugs almost indiscriminately because in many cases they are definitely of value and that furthermore to ferret out the etiologic agent is often fraught with great difficulties.

Respiratory infections are due to two types of agents: viral and bacterial, frequently the two acting as one. Sulfonamides are effective against almost any type of bacterial infection but are "singularly ineffective against the virus agents that often pave the way for the bacterial infection, or may be the sole cause of the infection." Apparently Janeway's rule is to judge of the severity of the infection and whether or not it is spreading before even considering the sulfonamides. In milder infections, such as the common cold, the child does not have a high fever and is not markedly toxic and does not appear severely ill. The leukocyte count is of great help; virus infections are not accompanied by a high white cell count, bacterial infections do produce a leukocytosis, but the leukocyte count is by no means conclusive. If the child then appears severely ill, Janeway's philosophy, as he expresses it, is to take the bull by the horns and give the sulfonamides a trial. If this decision has been arrived at then give the child adequate dosage. Unless chemotherapy is intensive it should not be employed at all. Abortive attempts at treatment may cause toxic reactions or the child may become sensitized and will be in trouble in case the drug might be required for truly serious infection later on. He advises that having determined to give the drug, promptly to examine the urine and keep on examining it regularly while treatment is being carried out. It is advisable, when possible, also to watch the blood count.

Of the various sulfonamide preparations, sulfadiazine is probably the most satisfactory, not only when given by mouth but the sodium salt can be given parenterally. It is very unlikely that sulfadiazine will produce disturbances in the child. The dosage is of importance. Janeway recommends that the physician start off promptly with adequate dosage and warns against the danger of first giving too little and then starting to give larger doses which may bring about toxic reactions. The dosage that he recommends is one grain per pound of body weight for the first 24 hours if there is serious infection. To the seriously ill child one-half to three-quarters of the daily dose should be given initially, that is, three-fourths of a grain per pound and then the grain per day per pound divided into either four or six doses to be continued until the dosage can be reduced to half a grain per pound for two days after the temperature has fallen. This amount is continued for a few days more until the child's infection is well under control. Sodium sulfadiazine, 5 per cent solution, may be given under the skin by clysis or it may be done with a syringe. This method naturally is of great value when the child is vomiting.

In the discussion of his paper it was asked why, in view of the general belief that many children are being saved from otitis, mastoiditis, bronchitis and pneumonia by the sulfonamides, they should not be given routinely. Janeway points out that to be effective a certain blood level has to be obtained and when sulfonamides are given in small doses their effect is probably minimal and that the great majority of upper respiratory tract infections subside spontaneously without complications. Other reasons for not using the sulfonamides in every instance have already been mentioned.

*Janeway, Charles A.: The use of sulfonamides in the treatment of respiratory infections in children, New England J. M., 229:201, 1943.

ORGANIZATION SECTION

The Executive Committee dedicates this page to the members of the Louisiana State Medical Society, feeling that a proper discussion of salient issues will contribute to the understanding and fortification of our Society.

An informed profession should be a wise one.

NOTICE TO ALL PARISH AND DISTRICT MEDICAL SOCIETIES

At the special meeting of the Executive Committee of the Louisiana State Medical Society held October 1, the inactivity of some of the component medical societies was discussed. A recommendation was made as follows:

"That it is the sense of the Executive Committee that there should be a revival of interest by parish and district medical societies, which they regard as essential to the survival of medicine; and that the Secretary of the Society write a letter to these societies urging that they have regular meetings."

Some of our societies have voted to disband during the period of the War. During these trying times, which have so materially affected the practice of medicine in this state as well as other states, our Executive Committee feels that there should be a continuation of medical activity in the various parish and district societies. At these meetings opportunity should be given for the liberal discussion of the grave problems that confront the medical profession today, so many of which are vital to our very existence. Some of these problems you have no doubt realized, especially after reading your medical periodicals and the editorials appearing in the last two or three issues of the New Orleans Medical and Surgical Journal. These editorials you will find in the Organization Section.

It is, therefore, hoped that your organization will co-operate to the fullest extent with the Executive Committee in this regard.

Most of our medical organizations in the metropolitan centers find many grave war problems to necessitate their continuance of their meetings. However, we feel that the doctors outside of these congested points should have the privilege of meeting, discussing, and planning. In our rural areas more so than in the cities there may arise an acute shortage of doctors and dislocations which might impair the fullest and best character of medical services. These gaps should be prevented, or where occurring promptly corrected. These problems should be discussed and brought to the attention of the state officers for aid. It is generally believed among the best informed, that unless we have further calls on the medical profession of this state by the fighting forces, that good medical care can be maintained. Six thousand more doctors in the United States are needed in the armed forces by 1944, but fortunately for Louisiana we are told by the State Committee on Procurement and Assignment that no further call this year will be made on the physicians of Louisiana. We, therefore, should husband our present medical resources and try to see that they are properly used, extended, and diverted for proper care of the needy in areas where adequate medical care is most needed. This is a big job, but the physicians of Louisiana are used to big jobs, and I am sure capable of meeting these emergencies. They have the envious tradition which inspires one to the opinion that in the final analysis they will do a good job.

ACTIVITIES OF THE EXECUTIVE COMMITTEE

The Executive Committee of the Louisiana State Medical Society has been most active since the last state meeting. They have held three meetings, during which time they have disposed of routine business and gave consideration and discussion to important war medical problems. As a result of this, very shortly it would appear that some definite counterplan will be prepared to meet the requirements of the public and physi-

cians in regard to services for maternity cases and children for families of enlisted men. This had been proposed by the Children's Bureau of the Federal Government. Now it is not a very easy task to assimilate a definite and precise plan to meet the ingenous demands being made in these proposals. Far reaching principles are involved necessitating cautious and pertinent study of the subject to prevent any imposition on medical practice. At the same time we become motivated by the apprehension of being called unpatriotic which often becomes a means of defeat and some failures. This problem has been given serious study by the special committee and the executive officers.

Another problem will soon be thrown in the laps of the Executive Committee for determination. It concerns the establishment of a quarantine building by the Louisiana State Board of Health or the United States Public Health Service at Charity Hospital in New Orleans to treat, cure, and possibly rehabilitate the infected female contacts suffering from venereal disease. From best information this is a part of the venereal control program of the United States Public Health Service to decrease the incidence of infection of the boys in camps and industrial areas. You may be assured that the best interest of the public and profession will be preserved by the Executive Committee in their deliberations, but it will call for profound thought and study to establish this program to the satisfaction of all concerned.

SENATE BILL NUMBER 1161

What are you doing to help to defeat this atrocious measure? Is it any wonder that the medical profession becomes alarmed and jittery every time some plan is proposed by the Federal Government and especially the United States Public Health Service. In view of the revolting and revolutionary provisions in the bill, and destruction of the American form of practice, can you blame the medical men for being skeptical about any other proposal under the guise of war necessity which might in reality have many virtues? Every doctor in this state has now had the opportunity of forming some definite opinion about this bill. You have been importuned through your journals, both state and national, in the form of editorials and factual data; various pamphlets have been sent you by the National Physicians Committee or other groups; the press and even the radio has contributed information by appeals or round table discussions. The lay public is being awakened to this octopus whose giant tentacles seductively camouflaged with patriotic war paint are motivated and primed for the final kill. You can help to forestall this measure if you have faith in your professional form of practice. Personal letters to your two senators and to the representative from your respective district in Washington will produce the best results. These congressmen shy at resolutions from groups, but they listen attentively to the protests of their individual constituents. So do inform yourself about this bill if by chance you have missed the opportunity, then write. Furthermore, have your friends and civic organizations to do likewise. We will be very glad to send any accumulated data that we may have for your or their information. Never before has the future of American medicine been so jeopardized. We must fight to preserve our American way of life and practice as we see it. This is as vital on the home front as it is on the battle line. So do write now.

HOSPITAL STAFF TRANSACTIONS AND CLINICAL MEETINGS

AMERICAN FEDERATION FOR CLINICAL RESEARCH

The New Orleans section met in June 1943, at the Louisiana State University Medical Center, 1542 Tulane Avenue. Abstracts of the program follow:

The Role of Congestive Heart Failure in the Production of the Edema of Acute Glomerulonephritis. (John S. LaDue, M. D.—From the Department of Medicine of the Louisiana State University School of Medicine and the Charity Hospital at New Orleans.)

Twelve patients admitted to Charity Hospital with acute glomerulonephritis complicated by peripheral edema were studied according to the following plan.

Patients were placed upon strict bed rest and given no medication except magnesium sulfate to control convulsions. Four patients were given a low protein, low salt diet; four a high protein, low salt diet; and four the regular house diet. There was no restriction of fluids, but the intake and output were charted. Daily measurements of the venous pressure, circulation time, blood pressure, weight, and degree of pulmonary, liver or peripheral edema were recorded. Frequent teleoroentgenograms and electrocardiograms were made, the urine was examined at least twice a week and blood urea and phenolsulfonphthalein excretion tests were done. On one patient, the vital capacity was measured every other day. The heart area and diastolic heart volume were determined from the teleoroentgenograms according to the method of Keys and Friedell. It was possible to secure edema fluid from two patients and total protein determinations were done on these fluids. Blood proteins and albumin-globulin ratios were determined for each patient.

Ten of the 12 patients had had an upper respiratory infection with cough, coryza and sore throat 10 to 21 days before the onset of their symptoms of glomerulonephritis, but in two patients no history of a preceding infection could be elicited.

Swelling of the face and legs was the chief complaint except in one child who was brought into the hospital because of convulsions. Nausea and vomiting occurred once and headache twice. Seven patients complained of dyspnea and orthopnea on admission and in three others it was noted on physical examination.

The neck veins were frequently engorged and rales were heard at the bases of both lungs in nine patients. Pleural effusions were encountered in four patients. The heart was markedly enlarged in eight patients and moderately enlarged in the remainder. The apical impulse was forceful in all patients and a systolic thrill was felt in three. The heart rate was above 110 in all but two instances. A systolic gallop rhythm was heard in four patients, but no other irregularities in rhythm were encountered. The pulmonic second sound was louder than the aortic second sound in the hearts of 11 of the 12 patients. The diastolic blood pressure was above 100 mg. mercury at some time during the first two days in every instance; the systolic blood pressure was 190 or more in five patients, but was 130, 135, 138, 145, 150, 165 and 180 in the remainder. The liver was enlarged in seven patients and ascites was noted twice.

The eye-ground findings were of interest. In two patients arteriovenous nicking was the only finding, in five patients it was associated with local lumen attenuation. In one patient a few pin point hemorrhages, as well as arteriovenous nicking and arteriolar spasm, were seen.

Hematuria was always present on admission and persisted until discharge in a few patients. Albuminuria was present in 10 patients and cylinduria in six. Elevation of the blood urea content was noted twice and in each instance the level fell to normal when the patient became compensated. The same two patients had a transient lowering of phenolsulfonphthalein excretion to 55 per cent which rose to 70 per cent or more before discharge.

Using the severity of heart failure as a basis for separation, the patients divide into three groups. Group I had no symptoms of congestive heart failure except edema, although the venous pressure was elevated in all. In Group II, in addition to edema and elevated venous pressure, there was moderate to marked dyspnea and orthopnea. Group III had such severe signs and symptoms of congestive heart failure that the administration of digitalis was thought necessary.

In Group I, the circulation time was above normal only in one patient. A drop in blood pressure preceded the fall of venous pressure and disappearance of edema in all three patients, but in two patients the blood pressure was nearly normal before the venous pressure fell to 10 cm. of water (upper level of normal).

Teleoroentgenograms taken on admission and after signs of congestive heart failure had disappeared showed a decrease in the diastolic heart volume in two patients of 95 c. c. and 82 c. c. Dieuresis and weight loss occurred over the critical period. Hematuria, as might be expected, was the last abnormality of the disease to disappear in these patients.

In Group II, the venous pressure was elevated in every instance and rose further upon right upper quadrant pressure, but none of the patients had prolonged circulation time. In all but one patient, an initial fall in blood pressure slightly preceded the clearing of congestive heart failure and the fall of venous pressure to 10 cm. of water or lower, but the exact time relations are not as clear cut as in the first group of patients. In four patients a significant decrease in the diastolic heart volume (130 c. c., 46 c. c., 118 c. c. and 164 c. c. respectively) was found at the time compensation was considered complete. One patient did not have a second teleoroentgenogram taken until two weeks after compensation was complete; at this time the diastolic heart volume had diminished by 85 c. c. There were weight loss and diuresis during the critical periods. Albuminuria and cylinduria were more pronounced in this group but hematuria persisted for approximately the same length of time as in Group I.

In Group III, three of the patients had ascites and pleural effusions in addition to marked findings of edema, dyspnea, orthopnea, liver engorgement and pulmonary rales. One of the patients was given Cedilanid intravenously, two took usual amounts of folia digitalis orally and all received

maintenance doses of 0.05 to 0.1 gram of folia digitalis daily.

In three patients the signs of congestive heart failure disappeared and the fall in venous pressure occurred before any significant alterations in blood pressure were observed. The blood pressure in one patient who had mitral stenosis fell before failure disappeared. In this patient, the mild attack of acute glomerulonephritis probably precipitated the severe congestive heart failure. The diastolic heart volume of another patient diminished 118 c. c. before compensation was complete. Two patients did not have x-rays taken until 32 and eight days respectively, after disappearance of the signs and symptoms of heart failure, but at this time a decrease in the diastolic heart volume of 100 c. c. and 357 c. c. had taken place. The transverse diameter of the heart of another patient had decreased 1.0 cm. in three days, according to a careful physical examination.

DISCUSSION

There appears to be a close correlation between the time of disappearance of congestive heart failure complicating acute glomerulonephritis and the time of occurrence of the initial fall in blood pressure, since the fall in blood pressure preceded the disappearance of the signs and symptoms of heart failure in seven of the eight patients who were not given digitalis. In three of the four patients who were digitalized, the blood pressure remained high for some time after the establishment of compensation. These facts appear to strengthen the suggestion of the etiologic importance of the blood pressure in the pathogenesis of the heart failure of acute glomerulonephritis, since it is well known that digitalis acts to decrease the diastolic heart volume and increase the mechanical efficiency of the failing human heart whatever the cause of the failure.

Measurements of the diastolic heart volume made within two weeks after compensation was established (the third teleorentgenogram) showed a further decrease in the diastolic heart volume of four patients. The finding of low to normal circulation times in all but one of these patients with acute glomerulonephritis, despite their elevated venous pressure, has not been reported before. This has been noted in heart failure due to beriberi and has been ascribed to diminshed capillary resistance. No explanation, however, is offered for the decreased to normal circulation time seen in our patients. The pulmonic second sound was accentuated in 11 of the 12 patients, suggesting the possibility of a pulmonary hypertension.

CONCLUSIONS

1. The edema of twelve patients with acute glomerulonephritis was found to be associated with right heart failure as indicated, in every instance, by an elevated venous pressure and cardiac dilatation.

2. In nine patients most of the symptoms of congestive heart failure were present, but in three patients the presence of peripheral edema was the only symptom suggesting heart failure. More careful study of these three patients disclosed cardiac dilatation and elevated venous pressure.

3. The importance of hypertension in the pathogenesis of and relief of the congestive heart failure which frequently complicates acute glomerulonephritis has been emphasized. The earliest objective evidence of improvement of the heart failure in seven of eight patients not given digitalis was a fall in blood pressure; the return to normal of the venous pressure and the disappearance of edema occurred slightly later.

4. There was a significant decrease in the diastolic heart volume of these patients after compensation had been established. This decrease was even greater two to four weeks after congestive failure had disappeared.

5. The circulation time was normal or low in eleven of twelve patients studied, despite an elevation of the venous pressure.

6. The pulmonic second heart sound was accentuated in 11 of 12 patients, suggesting the possibility of pulmonary hypertension.

A Renal Concentration Test Employing Posterior Pituitary Extract. (H. T. Engelhardt, M. D., and W. A. Sodeman, M. D.—From the Departments of Medicine and Preventive Medicine, Tulane University, School of Medicine and Charity Hospital of Louisiana, New Orleans.)

The renal concentration test employing posterior pituitary extract is based upon the renal action of this substance, which has been shown to inhibit water diuresis, as well as increase the chloride excretion. Not only is there a decrease in urinary volume, but an increase in the concentration of solids in the urine. This action takes place in spite of the ingestion of water, so that previous preparation of the patient by fluid restriction is unnecessary.

After the subcutaneous administration of 10 units of posterior pituitary extract, specimens are collected at the end of the first and second hours. In normal individuals, at least one of the specimens will show a specific gravity of 1.022, or more.

The dosage of posterior pituitary extract used does not affect the blood pressure. Hypertension is not a contraindication to the test. The extract causes coronary constriction and should be used with caution in angina pectoris. Acute coronary occlusion, sensitization, and late pregnancy are contraindications to its use.

The test is simple, requires only minimal cooperation by the patient, particularly as far as fluid restriction is concerned, and can be carried out immediately, without preparation of the patient, at any time of day. It is particularly indicated in edematous patients where other concentration tests are inaccurate because of diuresis. Furthermore, it

is of value in surgical patients where restriction of fluids is contraindicated.

THE MEDICAL DIVISION OF CHARITY HOSPITAL

The regular monthly meting of the Visiting Staff of the Charity Hospital was held October 19, 1943, in the Auditorium of the hospital. There were three interesting cases presented: The first one of remarkable splenomegaly due to reticulo-endotheliosis by Dr. J. H. Musser; the pathologic aspects of this case were fully discussed by Dr. Palik. The second case was presented by Dr. S. Chaillé Jamison with Dr. Jane Matthews-Day, showing an unusual case of tularemia. The last and final case was shown by Dr. J. S. LaDue and was one of the rather unusual types of cases, namely Loeffler's syndrome.

SOUTHERN BAPTIST HOSPITAL

The regular monthly meeting of the Baptist Hospital was held on October 26. On the program were two presentations; the first was an address by Mr. Allard Kaufmann, Service Director of the American Red Cross Blood Donor Center. The scientific paper was presented by Dr. Howard Mahorner on "Resection of the Colon."

SOCIETY FOR EXPERIMENTAL BIOLOGY AND MEDICINE

A meeting of the Southern Section of the Society for Experimental Biology and Medicine was held on Wednesday, October 27, 1943, at 8:00 p. m., in the Richardson Memorial. The program was as follows:

1. Adrenal Cortical Changes Following the Administration of Adrenal Cortical Extract in Guinea Pigs Receiving M. L. D. Doses of B. Welchii Toxin—Drs. Bjarne Pearson, Maxwell Kepl, Guy Caldwell, (by invitation), and Alton Ochsner, Department of Pathology and Surgery, Tulane University.
2. Fatty Material in Acid-fast Bacteria Revealed by Staining With Sudan Black B.—Kenneth L. Burdon, Ph. D., and Carl Lamanna, Ph. D., Department of Pathology and Bacteriology, Louisiana State University.
3. Measurement of the Rate of Insensible Perspiration (diffusion fraction) Locally, Through Living and Dead Human Skin—Drs. G. E. Burch and Travis Winsor (by invitation), Department of Medicine, Tulane University.
4. A Study of the Relative Influences of the Various Layers of Human Skin Upon the Rate of Diffusion of Water—Drs. Travis Winsor (by invitation) and G. E. Burch, Department of Medicine, Tulane University.
5. Excystation, Cultivation and Encystation of *Endamoeba Coli*—Miss M. Frances Mayfield, (Introduced by Dr. E. C. Faust), Department of Tropical Medicine, Tulane University.
6. Chronic Diarrhea Associated With Bacillus Paratyphosis Infection and Small Intestine Changes (Slides)—Drs. D. N. Silverman and A. V. Friedrichs (by invitation), Department of Pathology, Tulane University.

To Be Read By Title

1. Momentary Atrial Electrical Axes in Paroxysmal Tachycardia—Drs. George Decherd, Arthur Ruskin, and George Herrmann, Department of Medicine, University of Texas, Medical Branch.
2. The Effect of Sodium Pentobarbital on Hemoconcentration—Drs. Raymond Gregory and Paul L. Ewing, Department of Medicine, University of Texas, Medical Branch.
3. Studies on Guinea Pigs After Repeated Administration of Paraldehyde—Emmett B. Carmichael, Ph. D., Dr. F. A. Kay, and G. W. Phillips, Ph. D., Department of Chemistry, University of Alabama.

TRANSACTIONS OF ORLEANS PARISH MEDICAL SOCIETY

November 2. Board of Directors, Orleans Parish Medical Society, 8 p. m.
Eye, Ear, Nose and Throat Staff, 8 p. m.

November 3. Clinico-pathologic Conference, Charity Hospital Morgue Amphitheater, 1:30 p. m.
Mercy Hospital Staff, 8 p. m.

November 4. Clinico-pathologic Conference, Touro Infirmary, 11:15 a. m. to 12:15 p. m.
Executive Committee, Baptist Hospital, 8 p. m.

November 8. Scientific Meeting, Orleans Parish Medical Society, 8 p. m.

November 10. Clinico-pathologic Conference, Charity Hospital Morgue Amphitheater, 1:30 p. m.
Clinico-pathologic Conference, Marine Hospital, 7:30 p. m.
Touro Infirmary Staff, 8 p. m.
Women's Auxiliary, Orleans Parish Medical Society, Orleans Club, 3 p. m.

November 15. Hotel Dieu Staff, 8 p. m.
Clinico-pathologic Conference, Baptist Hospital, 8 p. m.

November 16. Charity Hospital Medical Staff, 8 p. m.

November 17. Clinico-pathologic Conference, Charity Hospital Morgue Amphitheater, 1:30 p. m.

Charity Hospital Surgical Staff, 8 p. m.

November 18. Clinico-pathologic Conference, Touro Infirmary, 11:15 a. m. to 12:15 p. m.

November 19. I. C. R. R. Hospital Staff, 12:30 p. m.

November 23. Baptist Hospital Staff, 8 p. m.

November 24. Clinico-pathologic Conference, Charity Hospital Morgue Amphitheater, 1:30 p. m.

Clinico-pathologic Conference, Marine Hospital, 7:30 p. m.

French Hospital Staff, 8 p. m.

November 25. Clinico-pathologic Conference, Touro Infirmary, 11:15 a. m. to 12:15 p. m.

November 26. L. S. U. Faculty Club, 8 p. m.

New Orleans Hospital Dispensary for Women and Children Staff, 8 p. m.

November 30. Clinico-pathologic Conference, Touro Infirmary, 11:15 a. m. to 12:15 p. m.

During the month of October the Society held two meetings—one regular scientific meeting and one special meeting. The following program was presented at the regular meeting:

Ephedrine Sulfate in the Treatment of Enuresis, by Dr. W. E. Kittredge.

Dr. Roy E. de la Houssaye opened the discussion.

New and Important Applications of Carbon Tetrachloride in Medical Therapy, by Dr. George Fasting.

Dr. Clyde Brooks opened the discussion.

The following program was presented at the special meeting:

Management of War Casualties at the Front, Colonel Rex L. Diveley, U. S. Army Medical Corps, Orthopedic Consultant of the American Expeditionary Force.

Colonel Diveley showed two colored motion pictures covering care of American war casualties and methods of treatment and rehabilitation; also tracing the bombing mission over enemy territory.

NOTICE

Nominations for Officers of the Society and Delegates to the Louisiana State Medical Society must be handed to the Secretary on or before the November meeting (Monday, November 8, 1943); nominations cannot be accepted after 9 p. m. the night of the November meeting.

Dr. John H. Musser attended a meeting of the committee on essential drugs and medical supplies of the National Research Council in Washington.

Dr. W. A. Sodeman recently delivered a series of lectures on nutrition to the physicians and staff of the Santo Tomas Hospital in Panama. Dr. Sodeman also made daily ward rounds at the Santo Tomas hospital as a part of the graduate program carried out under the auspices of the Panamanian Government.

Dr. E. Carroll Faust has recently been honored by the College of Physicians of Philadelphia with the Alvarenga Award for outstanding contribution to the study of medicine. The award, named in honor of the distinguished Portuguese physician, will be presented this month.

Dr. Clarence Steele presented a paper on Tinnitus Aurium and Dr. Thomas Findley presented a paper on Syncope at the October clinical staff meeting of the Ochsner Clinic.

At the October meeting of the Mercy Hospital staff Dr. Chris Bellone presented a paper on Utero-Sacral Ligament Shortening and Prolapse.

Lt. Col. I. M. Gage was recently ordered to the Fourth Service Command Headquarters at Atlanta, where he will assume the duties of Consulting Surgeon with the Fourth Service Command.

Lt. Col. Roy H. Turner has been transferred to the Lawson General Hospital at Atlanta.

Lt. Col. Charles B. Odom has been decorated with the Order of the Silver Star. The presentation was made by General George S. Patton, Jr.

Carol P. Cabibi, Mervin E. Fatter and Norton W. Voorhies were recently promoted from first lieutenants to captains.

Z. J. Romeo was recently promoted to the rank of major. Major Romeo is in foreign service.

Daniel J. Murphy, M. D.,
Secretary.

LOUISIANA STATE MEDICAL SOCIETY NEWS

CALENDAR

PARISH AND DISTRICT MEDICAL SOCIETY MEETINGS

Society	Date	Place
East Baton Rouge	Second Wednesday of every month	Baton Rouge
Morehouse	Second Tuesday of every month	Bastrop
Orleans	Second Monday of every month	New Orleans
Ouachita	First Thursday of every month	Monroe
Rapides	First Monday of every month	Alexandria
Sabine	First Wednesday of every month	
Second District	Third Thursday of every month	
Shreveport	First Tuesday of every month	Shreveport
Vernon	First Thursday of every month	

SENATE BILL 1161

If we study the system of American Government as formulated in Washington today, we can see a definite trend toward socialization of many businesses and professions, particularly in our own profession. An effort is being made now through the Wagner-Murray Bill (Bill No. 1161) to provide, without cost, not only general medical but special medical care, as well as laboratory and hospital benefits to practically all of our citizens.

This is an old problem and has come up several times in the last few years in our legislative bodies. The calling of so many of our doctors into the Armed Services has depleted our civilian care of the sick in many areas. There are areas today that are without doctors or with doctors reaching the age when they can no longer carry the increased burden placed upon them. Again, many of our areas have had a large influx of population due to war industries and a much larger burden again is placed on the doctors in these areas. These conditions have brought more forcibly to the attention of some the need for medical services, hence the Wagner-Murray Bill.

To meet these pressing demands and to enable a greater number of people to obtain medical care and hospitalization, which they could not otherwise afford, various groups have formed hospital insurance plans under the Blue Cross at a very nominal cost. As an example, here in New Orleans, approximately 115,000 people carry hospitalization insurance.

The following States have formed a statewide medical plan now in operation: California, Massachusetts, Michigan, New Jersey, Pennsylvania, and Utah. In addition, two other States—Delaware and North Carolina—are now offering policies covering medical services. Thirty-nine counties of New York State have medical plans with an enrollment of something over 30,000 policy holders. Fourteen counties in North Carolina with an enrollment of 15,000 have their headquarters at Durham. Dallas and Kansas City also have plans to take care of the low wage income group in their section. These groups should at least be given the opportunity to prove that medical services can be carried on an insurance basis before any radical changes are made by the Government.

The Wagner-Murray Bill now goes all the way and proposes to give medical care free, or at a nominal cost, to all of our citizenry. What effect would this bill have on our profession? Would it cause the practice of medicine to deteriorate? Would it ruin the finest medical service in the world and would it deprive the average American of the excellent service he receives from our profession today? If we take the history of other countries, our only answer would be that the type of service now rendered would greatly deteriorate. Again, it is highly impracticable and unworkable, in my opinion, to set rules and standards for medical treatment or to try to regulate the relationship between patient and doctors that would answer the purpose in other sections of our country, because conditions are widely different. This Bill negates the right of the profession to maintain its present legal and social position. American medical aid at its best is what the public seeks and must have. Our profession is interested in the preservation of health and the saving of life according to the high standard that has been founded after years of long and intelligent studies and efforts to give the maximum that is humanly possible to give. The American public is not interested in a minimum of advice or prescription—he wants and demands the best of service to which he is accustomed.

There should be no question as to the right and freedom of any individual to enter the profession, or to the patient seeking medical aid, or for any State to legislate for the legitimate practice of medicine. The question is how to make competent medical service available to all who might be in need. Medicine should not and must not be handled as a business or a trade, for it is a profession in spite of the fact that the Supreme Court rendered a decision that it was a trade. The profession means work to the men and women who dedicate their lives to serving others, whose skill has been developed after long years of hard work and under prolonged and exacting training. No professional man who enjoys the respect of his

community operates for profit only. Naturally, his living is made by his work, but his services are given untiringly to benefit others and not himself. All work solely for the individual sufferer, with only one objective in view and that is to solve his problem and restore him back to health and normal life in the shortest possible time.

The doctor, except those in public health service, does not serve the masses. His service is a contract between the patient and himself and if he should be called upon to serve in an emergency or a general calamity this is a service beyond his ordinary call of duty and is given through his own free will and his desire to help his fellow human. We doctors have always prided ourselves in our training and our service. The Government might provide the training freely, but under no circumstances or conditions would it ever be able to provide the ambitions and sacrifices and the devotion to one's fellowmen as the ideal professional man possesses it today. Nor could Government demand that wholehearted untiring attention to the patient which is most certainly an outstanding mark of our profession.

The Wagner-Murray bill as written would certainly create a new class of political doctor and, as we all know, political classes in America are subject to the common influence of political practice, seeking rewards and avoiding burdens as well as shirking duties. Of course, there are exceptions, but they are a rarity. The system as it operates does not elevate personal ideals, and surely doctors without personal and professional ideals are not worthy of the title "Doctor."

The bill would assign certain sections of the population to certain doctors, and this would certainly destroy all personal relationship of doctor and patient. It may even go as far as to have the confidence of the patient in his doctor destroyed. No longer could the attention be given to a patient as it is done in private practice today, and the patient would be subjected to routine treatment and advice. At least this is the experience gained from State medicine as practiced in other countries.

Again, what would become of research and in-practice studies. It is almost inconceivable that all doctors would spend days, weeks, and months in experiments, in reading the latest findings of the profession during his leisure hours in trying to improve his technic when there was no reward in sight for his efforts. Again, who could expect doctors to face the dangers, risks and untold sacrifices that are ever present in the following of his profession. The doctors who are real representatives of their profession seek as their reward their good name and unquestionable reputation among their fellows and among their present and prospective patients.

This Bill would kill the incentive most doctors have to make the most of their abilities and natural gifts and would place the laggard and disinterested ones on the same plane and level with the studious and ambitious. Any Government controlled system which would tend to lower these high standards of our profession would most certainly be a detriment rather than a help. We must not destroy the incentive and ambition always to improve one's self, and regimentation, as I see it, can have this effect only.

The financial aspects of the Bill are as follows:

The Bill provides that:

a. Sec. 960—Every employer shall pay a tax on wages paid to individuals (up to $3,000 per year) of..... 6%
b. Sec. 961—Every employee shall pay a tax, deducted from wages on earned income, up to $3,000 per year, of..... 6%
Total from payrolls..... 12%
c. Sec. 963—Every self-employed individual shall pay a tax on the market value of his services up to $3,000 per year, of..... 7%
d. Sec. 962—Federal, State and municipal employees (under certain conditions) shall pay a tax of..... 3½%

It has been estimated by the Treasury Department that, broadening the base of Social Security taxpayers and beneficiaries, as above outlined—with existing rates (total 5 per cent) would raise $5,000,000,000.00 of revenue annually. On this basis the total annual revenue from Bill 1161 rates would be twelve billion dollars ($12,000,000,000.00).

The Bill provides (Section 969) the establishment of a trust fund to be known as "Federal Social Insurance Trust Fund." Into this fund all Social Security taxes would be paid—$12,000,000,000 annually.

The Bill provides: (Section 913)

a. There is hereby established within the Trust Fund a separate account to be known as "The Medical Care and Hospitalization Account;"
b. The managing Trustee shall credit to this account—
   1. One-fourth of the contributions paid, in accordance with sections 960 and 961 respectively, of this Act.
   2. Three-sevenths of the contributions paid, in accordance with Sections 963, 964 and 965 respectively, of this Act.

In such manner, on the basis of the above estimates, a minimum of three billion dollars ($3,000,000,000) each year would be transferred from the Trust Fund to the Medical Care and Hospitaliation Account.

The Bill provides (Section 907):

a. The Surgeon General shall publish a list of institutions found by him to be participating hospitals.
   (The term "participating hospitals" means an institution found by the Surgeon General to afford professional service, personnel,

and equipment adequate to promote the health and safety of individuals customarily hospitalized in such institutions and to have procedures for the making of such reports and certificates as the Surgeon General and the Social Security Board may from time to time require.

(The term "hospitalization benefit" means an amount, as determined by the Surgeon General after consultation with the Council and after approval by the Social Security Board; not less than $3 and not more than $6 for each day of hospitalization, not in excess of thirty days, which an individual has had in a period of hospitalization; and not less than $1.50 and not more than $4 for each day of hospitalization in excess of thirty in a period of hospitalization; and not less than $1.50 and not more than $3 for each day of care in an institution for the care of the chronic sick.)

How much is three billion dollars? What can be done with it? What can be accomplished? The potential can be understood only by comparisons.

For the ten year period from 1924 to 1938, both years inclusive, the total revenue of the Government of the United States, from all sources, was $35,412,944,412—or an annual average of $3,541,294,441.

For the five year period beginning April 1, 1931 to March 31, 1935 the total revenues of the German Government were $15,725,840,000. This represents an average total income at the rate of $3,145,168,000 per year.

In 1940 the total expenditures of the Japanese Empire were $1,999,773,180. $1,150,000,000 of this amount was appropriated to carry forward the China War. Non-war expenditure totaled $849,773,180.

In 1938 the total expenditures of the pre-war Government of France for all purposes were $3,130,777,635.

Senate Bill 1161 provides for placing in the hands of one man a sum three times the amount of the normal non-war expenditure of Japan and approximately equal to the pre-war expenditure of the Government of the French Republic.

It is estimated that, at the present time, there are in the United States, available for civilian practice, 120,000 effective physicians. With three billion dollars the Surgeon General could—

a. Allocate 20 per cent for administration costs	$ 600,000,000.00
b. Hire every effective physician in the United States at an average salary of $5,000 a year	600,000,000.00
c. Buy every available bed in every non-government owned hospital (368,046) 365 days each year (134,336,790 hospital bed-days) at $5.00 per day	671,683,950.00
d. Pay $2.50 per day for each and every government owned hospital bed (1,051,781) 365 days in the year (383,900,065 hospital bed-days)	959,750,162.50
e. Spend for drugs and medicines	168,565,887.50
	$3,000,000,000.00

In addition to the above:

The Bill provides (Section 1111):

"For the purpose of encouraging and aiding the advancement and dissemination of knowledge and skill in providing benefits under this Act and in preventing illness, disability, and premature death, the Surgeon General is hereby authorized and directed to administer grants-in-aid to non-profit institutions and agencies engaging in research or in undergraduate or postgraduate professional education.

"For the purpose of this subsection there shall be available, for each calendar year beginning with the calendar year 1944, an amount equal to 1 per centum of the total amount expended for benefits from the Trust Fund, exclusive of unemployment insurance benefits, or 2 per centum of the amount expended for benefits under Title IX after benefits under that title have been payable for not less than twelve months, whichever is the lesser, in the last preceding fiscal year.

"Such grants-in-aid, in such amounts and for payment at such times as are approved by the Surgeon General, shall be certified for payment by the Social Security Board to the Managing Trustee, who shall pay them from the Trust Fund to the designated institutions or agencies."

Assuming that out of the $3,000,000,000—$600,000,000 is spent for administration and $2,400,000,000 is paid out in benefits—and that this measure is taken—the Surgeon General would have 2 per cent of this sum or $48,000,000 each year, to spend for medical education and medical research.

With the amount available, the Surgeon General could—

a. Assume the total costs of operating the 66 accredited medical colleges in the United States	$21,491,248
b. Subsidize 22,000 medical students to the extent of $700 per year for a period of four years	15,400,000
c. Spend for other research each year	11,108,752
	$48,000,000

or

a. Duplicate all existing medical teaching facilities	$22,000,000
b. Pay 20,000 additional medical students $700 per year during the period of training	14,000,000
c. Otherwise spend	12,000,000
	$48,000,000

Val H. Fuchs, M. D.,
New Orleans

N. A. C. D. S.

The following resolution was adopted by the National Association of Chain Drug Stores at Board of Directors meeting held on September 9, 1943:

Whereas there has been introduced in the Senate of the United States Bill No. S-1161, having for its purpose the amendment of the Social Security laws of the United States, to provide for a system of Federally controlled medical service;

And whereas this Association believes that at a time when the whole energies of the nation are being devoted to the waging of a global war for the preservation of democratic institutions, and when a large proportion of the medical profession is unselfishly devoting itself to the furnishing of medical care to the forces at the battle front, risking not only their lives and health but their possible future financial security, it is neither fair nor democratic to propose so drastic a change in the practice of medicine.

Now, Therefore, be it resolved that the Board of Directors of the National Association of Chain Drug Stores urge upon the Congress of the United States to take no action upon this Bill until after the end of the present conflict and after the return to their private practice of the doctors now in the military service of their country so that they may have an opportunity to present their views.

FOURTH DISTRICT MEDICAL SOCIETY MEETING

The Fourth District Medical Meeting was called to order, after dinner served in the dining room of the Shreveport Charity Hospital, by Dr. J. P. Sanders, the President, on October 5, 1943.

We were very happy to have Dr. DeGravelles, our state society president, with us. He discussed briefly the pending Wagner-Murray Bill which he stated would regiment all the members of the medical profession. He thought that the bill had a good chance of passing because it had the blessings of Mrs. Eleanor Roosevelt and the powerful Labor Unions.

He stated that American doctors have given their patients the best brand of medicine the world has ever seen and that this will all be destroyed by political medicine whose leaders are usually picked by their political amenability rather than by ability.

He suggested that the doctors of the State should and must become familiar with this bill and then talk it before civic groups and other groups of people to familiarize the public with it as most people believe it is something for nothing. These people should be made to realize that it means another deduct of 6% from their wages and that the cost of living must rise to compensate for the corresponding 6% the employer is required to give. If the doctors continue to sleep they will awaken to find this bill saddled to their backs.

Dr. DeGravelles further pointed out that one of our State Senators was for this bill and that the doctors and those they could influence should express their views by letter to their legislators in Washington.

The Scientific Program was given by Dr. Rawley M. Penick, Jr., Assistant Professor of Clinical Surgery of Tulane University. The topic of his paper was "Lessons from War Surgery." His talk considered in detail the treatment of shock, in which he stated that we in civilian practice were not using large enough quantities of blood plasma. He further discussed and compared the treatment given by civilian doctors and doctors of the armed forces for wounds in general, those of the face, head, chest, heart, intra-abdominal, extremities and burns and pointed out lessons we could learn from the armed forces' experience.

The discussion was opened by Lieutenant Mitchell of the U. S. Naval Reserve Medical Corp. He gave some very interesting experiences of care of the wounded under battle conditions which he could speak about from first hand experience. The paper was further discussed by Captain Cooper of the U. S. Army Medical Corps, Dr. D. A. Huckabay and Dr. R. K. Womack.

The annual election of officers of the Fourth District Medical Society was then held and the following were elected for the coming year: President, Dr. W. R. Harwell; Vice-President, Dr. W. R. Mathews; Sec-Treas., Dr. J. D. Youman; Delegate, Dr. J. M. Bodenheimer.

J. D. Youman, M. D., Sec'y.

SECOND DISTRICT MEDICAL SOCIETY

The Second District Medical Association met at the home of Dr. P. A. Donaldson, Reserve on Thursday, Sept. 30th. Those present were: Drs. Massony, Sharp, Paul Landry, Clayton, Kelly, Guillotte, Katz and Councilor O'Ferrall. Guests from New Orleans were: Drs. Harrison, Alsobrook, Cole and Connely. At this meeting was held the inauguration of the new officers: Dr. P. A. Donaldson, President; Dr. J. J. Massony, Vice-President; Dr. R. A. Kelly (to replace Dr. Waide who died in office) as Secretary-Treasurer; Dr. J. W. Atkinson, Delegate; Dr. P. P. La Bruyere, Jr., Alternate Delegate. A very pleasant meeting was held followed by a delicious supper served by Mrs. P. A. Donaldson.

VERNON PARISH MEDICAL SOCIETY

The physicians of Vernon Parish met in Leesville on October 7, 1943, at 8:00 p. m. and organized the Vernon Parish Medical Society. The following officers were elected and installed: Dr. William Marvyn Johnson, President; Dr. William E. Reid, Vice-President; Dr. Edgar M. Shaw, Secretary-Treasurer.

The first Thursday of each month was designated as the regular meeting date for the society. Such an organization was formed in 1903 and disbanded in 1936.

LOUISIANA STATE UNIVERSITY MEDICAL SCHOOL

Dean B. I. Burns of the School of Medicine of Louisiana State University, announces the following promotions and new appointments on the medical school staff, effective with the opening of the 1943-1944 session:

Promotions—Department of Anatomy: Dr. R. N. Baillif, from Instructor to Assistant Professor. Department of Medicine: Dr. R. H. Bayley, from Assistant Professor to Associate Professor; Dr. Alice B. Holoubek, from Assistant to Instructor; Dr. Louis A. Monte, from Clinical Assistant Professor to Clinical Associate Professor. Department of Obstetrics and Gynecology: Dr. Rupert E. Arnell, from Associate Professor to Professor; Dr. R. F. Phillips, from Clinical Assistant to Clinical Instructor. Department of Physiology: Dr. Walter S. Wilde, from Instructor to Assistant Professor. Department of Pediatrics: Dr. Joel Fleet, from Second Year Resident to Instructor. Department of Surgery: Dr. John L. Dileo, from Fourth Year Resident to Instructor.

New Appointments—Department of Anatomy: Dr. Donald Duncan, A. B., Carleton College, M. A. and Ph. D., University of Minnesota, to the position of Professor of Anatomy. Dr. Duncan comes to Louisiana State University from the University of Texas, where he was Associate Professor of Anatomy from 1932-41 and Professor of Anatomy frm 1941-42; Dr. William Lane Williams, B. S., Wofford College, M. S., Duke University, Ph. D., Yale University, to the position of Assistant Professor of Anatomy. Dr. Williams was formerly associated with Yale University School of Medicine as an Instructor in Anatomy; Dr. Clarence Edward Klapper, B. A., Union College, M. A. and Ph. D., from Cornell University, to the position of Instructor in Anatomy. Dr. Klapper has been associated with Hobart College for the past five years.

Department of Biochemistry: Dr. Lionel Robert Ryklan, B. A. and Ph. D., University of California, to the position of Instructor in Biochemistry. Dr. Ryklan was a Teaching Assistant and a Research Associate at the University of California from 1940-1943.

Department of Nursing Education: Miss Cecilia Perrodin, B. Ed., Superior State Teachers' College, M. S., Catholic University of America, to the full-time position of Assistant Professor in the Department of Nursing Education. Miss Perrodin was formerly connected with the Nursing Education staff in a part-time capacity.

Department of Pathology and Bacteriology: Dr. Gretchen Vitter Squires, M. D., Louisiana State University School of Medicine, to the position of Instructor; Dr. Rudolph Marshall, Jr., M. D., Louisiana State University School of Medicine, to the position of Assistant; Dr. Pliny Arunah Allen, M. D., Harvard University School of Medicine, to the position of Assistant.

Department of Physiology: Dr. Frederick Palmer Ferguson, B. A., Weslyan University, Ph. D., University of Minnesota, to the position of Instructor. Mrs. Alice I. Gremillion, A. B., Mt. Holyoke College, M. S., Louisiana State University, to the position of Assistant.

Department of Surgery: Dr. James Samuel Newton, M. D., Iowa State University, to the position of Instructor.

Dean B. I. Burns of the Louisiana State University School of Medicine was in attendance at the annual meeting of the Association of American Medical Colleges which was held in Cleveland on on October 25-27. He will also represent Louisiana State University at the Centennial Celebration of Western Reserve University at Cleveland on October 28.

Dr. Theodore J. Dimitry, Director of the Department of Ophthalmology, will address the Thirteenth Annual Fall Clinical Conference of the Oklahoma Clinical Society on Thursday, October 21, in Oklahoma City. His subject will be Diagnosis from Ocular Symptoms. Dr. Dimitry goes to Oklahoma City from Fort Worth where Friday, October 15, he addressed the Fort Worth Eye, Ear, Nose, and Throat Society on the subject of Recent Advances in Ophthalmology.

NEWS ITEMS

Surgeon A. B. Wight has been ordered to the Marine Hospital, New Orleans, as has Surgeon Sidney Immergut. P. A. Surgeon M. M. Greenbaum has been sent to the Public Health District No. 4 in New Orleans. Asst. Surgeon Mayo L. Emory has been relieved from duty in New Orleans and sent to the Public Health Service Medical Center, Hot Springs, Arkansas.

Dr. Charles F. McKhann, who has for several years been on the faculty of the University of Michigan, has resigned from that institution to accept a position as Assistant to the President of Parke, Davis and Company. Dr. McKhann will devote his time entirely to the scientific activities of the company. He will assume his new duties October 15.

The third nation-wide competition for the Schering Award is now open. Three major prizes of a total value of $1000.00 will be awarded to undergraduate medical students who submit the best critical dissertations on the subject "Hormones and Cancer". As in previous years, the Judges for the Schering Award will include oustanding American investigators in the fields of endocrinology, medicine and chemistry.

Dr. H. W. Kostmayer and Dr. J. H. Musser attended the yearly meeting of Association of American Medical Schools in Cleveland, Ohio, October 25-27, 1943.

THE NEED FOR PROTECTIVE SERVICES IN TIME OF WAR

Rumors that civilian defense is no longer necessary have recently been spread by irresponsible persons. These rumors are thoughtless or calculatingly subversive for they are not supported by Army Authorities responsible for our coastal defenses nor by the present military situation, writes Dr. George Baehr.

Fortunately, the success of our armed forces overseas has saved us thus far from experiencing the horrors of enemy bombing to which the cities of our Allies are being subjected. In the opinion of the best military authorities our coastal areas and industrial centers will not be free of the danger of enemy attack from the air nor of widespread sabotage until the last day of the war.

Civilian defense is needed also as one of the essential measures for safeguarding internal security. This is especially true of the Emergency Medical Service. If we had not created a nation-wide organization for civilian defense two years ago, we would be obliged to organize one today for home security. Disasters of all kinds have increased because of the tremendous speeding up of our great industries, the overburdening of our railroads, and the inexperience of hundreds of thousand of new war workers. Our police, our fire departments, our public works and utility services, and our hospitals, upon which we depend for protection, are being increasingly depleted of trained personnel.

We must, therefore, strengthen our voluntary protective services throughout the land. Along the Pacific, the Atlantic, at its Gulf coasts these services must be especially strong in volunteer personnel and equipment to guard us against the hazards of enemy attack and sabotage until that day when the Army, itself, advises us that the danger is ended.

MEDICAL AND SURGICAL RELIEF COMMITTEE OF AMERICA

A recent gift of sedatives by the Medical and Surgical Relief Committee is but a small part of the medical equipment requested by the War Shipping Administration's Medical Division in New York. To War Shipping Administration representatives serving in various foreign ports, the Committee has donated 16 large emergency medical field sets, at a cost of $140 each. Specially designed by the Committee's medical board, the field set consists of 2 valise-sized cases, for use by doctors for wounded and ill merchant seamen. Its drugs, antiseptics, bandages, sutures, syringes and minor surgery instrument roll equip it for an emergency, Dr. Hoguet pointed out.

Medical supplies in strategic ports are often scarce, yet merchant seamen landing there, either as injured or sick crew members or as shipwreck survivors, need on-the-spot treatment. This emergency care is what the Committee's set provides. Carefully packed for immediate use, the sets are portable, and can be carried directly to where the casualties are.

Conducted for over 3 years, the Medical and Surgical Relief Committee is dedicated to supplying medical and surgical aid to the armed and civilian forces of the United Nations. To date, over $572,000 of drugs, instruments, serums, vitamins and other equipment have been distributed to maritime and military units of America and her Allies, to needy hospitals, war-zone welfare agencies and to civilian defense posts throughout the free world. "So far," declared Dr. Hoguet, "not one request from a reputable source has been turned away . . . and our donations have circled the globe."

HEALTH OF NEW ORLEANS

The Bureau of the Census, Department of Commerce, reports that for the week ending September 11 there was a gratifying decline in the number of deaths in the City of New Orleans, 111 as compared to 145 the previous week. Seventy-two of these deaths occurred in the white population and 39 in the colored. There were nine deaths in children under one year of age. For the week closing September 18, 126 deaths were listed, 80 of these being in the white and 46 in the colored of the community. Twelve of the deaths were in children under one year of age. The deaths in New Orleans for the week ending September 25 were exactly the same as they were two weeks before, a rather remarkable coincidence. There were exactly the same number of deaths in the white population and the colored population as the two weeks prior to this week. One hundred and thirty-one citizens of New Orleans died during the week of October 2. These were recorded as occurring 85 in the white and 46 in the negro population. A surprisingly large number of infants died this week, the total being 19. For the week terminating October 9 there occurred 108 deaths, 66 of whom were white

and 42 colored. Of the infant deaths 11 were in the white and three negro children. For the corresponding week the three year average showed figures of 127. The City of New Orleans is doing itself proud in the reduction of its mortality rate.

INFECTIOUS DISEASES IN LOUISIANA

For the week ending September 11, the weekly morbidity report of the Louisiana State Board of Health showed there were recorded the following reportable diseases in numbers greater than 10: 44 of food poisoning, 31 of pulmonary tuberculosis, 24 of typhoid fever, and 12 of bacillary dysentery. There were also listed three cases of poliomyelitis, six cases of typhus fever, and three of undulant fever. The typhoid fever cases were quite generally scattered throughout the state except at St. Landry Parish with six cases. There was a very sharp increase in the number of cases of pulmonary tuberculosis, a greater number being reported during the week of September 18 than for many months. Seventy-nine of these cases were listed, followed in order of frequency by 17 of malaria, 11 each of bacillary dysentery, typhoid fever, and typhus fever. The four cases of poliomyelitis reported this week came two from Orleans Parish, one from St. Landry, and one from Vermilion. Six of the cases of typhus fever reported were from Orleans Parish, and not more than one from any other parish. St. Landry Parish with five cases was the only parish to report more than two cases of typhoid fever. For the week which closed September 25, there were reported 28 cases of pulmonary tuberculosis, 22 of measles, and 12 of typhus fever. There were four cases of poliomyelitis listed this week, and seven cases of typhoid fever, none being reported from St. Landry Parish and not more than one from any one parish. Typhus fever, which is approaching frequency of typhoid fever, had five cases reported from Caddo Parish and two each from Rapides, Avoyelles and Orleans. For the week which closed October 2, the monthly status of venereal diseases are reported. During the month of September there were 2,789 cases of syphilis, 1,963 of gonorrhea, and 89 of chancroid. There were also listed 45 cases of pulmonary tuberculosis, 11 of bacillary dysentery, and 10 of typhus fever. Only one case of poliomyelitis was recorded this week. There were six cases of malaria found in the state and 13 of unclassified pneumonia. Eight hundred and thirteen of the cases of gonorrhea, 547 of the syphilis cases were reported from military sources.

DR. ALLEN W. MARTIN

(1882-1943)

The many friends and colleagues of Dr. Allen Walker Martin were deeply disturbed to hear of his relatively sudden death on October 6. Dr. Martin for several years had been vice-chairman of the House of Delegates of the Louisiana State Medical Society, and at the recent business meeting of the organization was made chairman of this body. He had always taken a very active interest in the affairs of the State Society and well merited this important position. In addition to his activities in the field of medicine, he was active also in civic, political and social affairs in Washington Parish. He served as coroner of the parish for four years. He was active in the B. P. O. E. and in other fraternal and civic organizations. Dr. Martin's family was decidedly medically inclined. Two of his brothers are practicing in Louisiana.

DR. PATRICK H. FLEMING

(1890-1943)

Dr. Patrick Henry Fleming, St. Martinville, was born in St. Martinville, Louisiana on February 26, 1890. He graduated in medicine from Tulane University in 1911, and has practiced in St. Martinville since then. He was for many years Secretary-Treasurer of the St. Martin Parish Medical Society; was President of the Third District Medical Society for one year, and Secretary-Treasurer of that organization for two years. Dr. Fleming died on September 29, 1943.

WOMAN'S AUXILIARY

The Woman's Auxiliary to the Ouachita Parish Medical Society held their monthly meeting at the Frances hotel. Mrs. P. L. Perot presided and introduced Dr. Gallaspy, president of the Ouachita Parish Medical Society who gave an interesting talk on blood plasma. Hostesses on this occasion were, Mrs. Mahr, Mrs. William Bendel and Mrs. DeWitt Milam. The following members were present: Mrs. D. M. Moore, Mrs. W. L. Bendel, Mrs. John Praçher, Mrs. R. W. O'Donnell, Mrs. Irving Wolff, Mrs. F. C. Bennett, Mrs. Clifford Johnson, Mrs. A. D. Tisdale, Mrs. P. L. Perot, Mrs. G. T. Gallaspy, Mrs. H. V. Collins, Mrs. E. G. Calvert, Mrs. A. G. McHenry, Mrs. B. E. Barham, Mrs. C. P. Gray and Mrs. A. L. Peters.

Thanks Ouachita Parish. We are glad to know of the work you are doing and your fine cooperation. Reports from auxiliaries are still conspicuous by their absence. I am sure other auxiliaries are busy doing things that would be of interest to all of us, and I should like to have some news from them to report.

Mrs. M. C. Wiginton,
Press and Publicity Chairman.

BOOK REVIEWS

Surgical Physiology: By Joseph Nash, M. D. Springfield, Charles C. Thomas, 1942. Pp. 496. Price, $6.00.

This book has been written with the purpose of presenting "simply and briefly those aspects of physiology which are of especial importance in surgery." In this respect it meets a need which has been rapidly developing.

The text is divided into seven sections; the first three dealing with the circulatory, respiratory, and alimentary systems, the fourth with body fluids, the fifth with endocrine glands, the sixth with the cerebrospinal nervous system, and the seventh with the autonomic nervous system. At the end of the book a representative list of references are placed alphabetically.

The subject material is up-to-date, fairly comprehensively considered, and written in a simple concise, and explicit style. The significance of a thorough concept of physiological principles in surgery as well as in internal medicine is increasingly evident. For this reason this book will be of particular value to internes and surgical trainees, but even those interested in other fields of medicine will find it useful.

MICHAEL DEBAKEY, M. D.

Clinical Parasitology: By Charles Franklin Craig, M. D., M. A. (Hon.), F. A. C. S., F. A. C. P., D. S. M. and Ernest Carroll Faust, M. A., Ph. D. 3rd Ed. Philadelphia, Lea and Febiger, 1943. Price, $9.00.

The increased importance of tropical and parasitic diseases on the stage of present world history has made the new and revised edition of Craig and Faust's Clinical Parasitology a timely one.

In bringing the subject matter up to date, page margins have been reduced, thus allowing for considerable increase in new textual matter, maps, charts and figures without increasing the total number of pages. Apparently a lighter weight paper has been used which has reduced the overall size of the book.

The organization of the material is based upon that of the second edition. The technical information is divided into five sections: (1) Protozoa and Protozoan Infections; (2) Helminths and Helminthic Infections; (3) Arthropods and Human Disease; (4) Technical Appendix and (5) The Literature of Clinical Parasitology.

By way of introduction to the five sections there is an excellent general introduction in which the authors define the field which they will discuss together with important technical terms. The course of parasitic infections, the routes of migrations of parasites through the body, the reproduction of parasites, the damage produced in the tissues by parasites, the signs and symptoms of the diseases produced, the differential diagnosis, therapeusis, methods of control and geographical distribution of human parasitic diseases are discussed in broad and general terms. It is recommended that this material be reserved for serious thought and study by the student only after the textual matter has been completely digested. Following this general discussion is an outline giving important dates and events in the history of the development of human parasitic diseases.

Finally there is a brief statement on the "basis and significance of binomial nomenclature." The statement, "The present day scientific names of animals, . . . date back to the days of Linnaeus, who first used binomial nomenclature for a given species", is misleading, for the binomial system of zoological nomenclature was in use before the time of Linnaeus.

Section I: The treatment of protozoa and protozoan diseases has been greatly enhanced by the inclusion of 24 either new or re-done figures, one table on the prevalence of amebiasis in the Western Hemisphere, four color plates of the malarial plasmodia and a new chapter on the Sarcosporidia and Toxoplasma. Figure 10, showing the cysts of common protozoa of man, figure 28 on the geographical distribution of the leishmaniases, figure 40 on the distribution of Gambian and Rhodesian trypanosomiases, and figure 70 on the distribution of malarial fevers, are especially fine. The reviewer, being familiar with the splendid colored original of figure 10, so painstakingly executed by Miss Nadene Denison, feels it is regrettable that the chart was not reproduced in its original color.

On page 71 the differential diagnosis between *Endamoeba histolytica* and *E. coli* is said to be "easily" accomplished by reference to morphologic characteristics in table 3. This is true for specimens with clear-cut characters; but the authors surely would concur in the statement that the differential diagnosis of these species is by no means a cut and dried matter, and that time and time again it is very difficult even for the highly trained technician to distinguish *E. histolytica* from *E. coli* as well as *Endolimax nana*, *Iodamoeba bütschlii* and *Dientamoeba fragilis*. It might have been well, particularly for beginning students of parasitic diseases and medical technicians, to have incorporated a precautionary statement to the effect that differential diagnosis of the common amoebae of man, especially the cystic stages, involves an intimate and personal knowledge of the natural variation of each species, acquired only after long and patient examination of many forms.

Four protozoan parasites, namely, *Eimeria clupearum*, *Eimeria sardinae*, *Plasmodium wilsoni* and *Toxoplasma gondii*, are discussed for the first time.

Section II. The section on helminths and helminthic diseases has been augmented by the addition of eleven new figures. Figure 105, showing

the NIH anal swab, should be helpful to physicians in the diagnosis of pin worm infections.

The geographical distribution of *Strongyloides stercoralis* is said to be primarily in warm countries (p. 247) and sporadically in temperate zones. Unpublished data of the reviewer indicate this worm is fairly common among inhabitants of Central Kentucky.

Five helminths, *Plagiorchis philippinensis, P. javanensis, P. muris, Inermicapsifer cubensis* and *Mesocestoides variabilis,* are discussed for the first time.

Section III. The section on Arthropods and Human Disease has been revised and a considerable amount of new material has been added. Of the eleven new figures, figure 233 on the distribution of the rickettsial diseases, figure 258 on the distribution of yellow fever and figure 281 on the distribution of plague, are particularly valuable. As a helpful complement to the text, new diagrams of the transmission cycles of endemic and epidemic typhus (fig. 259) and of plague (fig. 282) have been made. A key for the identification of adults and larvae of anopheline mosquitoes and a chart giving comprehensive biological and epidemiological information on mosquitoes concerned in transmission of yellow fever are other new features of the text.

A welcome addition to this section is the amplified treatment of tick, mite, louse and mosquito-borne diseases. To those users of the second edition the extended treatment of these diseases in the third edition will complete the over-all picture of disease and transmitting host as it relates to man.

On page 537 the methyl bromide technic is mentioned as a method for delousing of clothing and bedding. Methyl bromide, widely used as a fumigant in the control of pests on grains, has recently been found to be highly efficient for killing the nits and adults of human lice. Since it has come into wide usage in mass disinfestation procedures, it might have been appropriate in this work to have elaborated on the technic. It is now possible to utilize methyl bromide in bags for sterilizing clothing and other equipment in field operations.

In outlining the general procedure for the disinfesting of individuals, it is recommended on page 537 that hair be shaved. This practice, of course, results in an uncomfortable condition when the hair begins to grow out, and initially is time-consuming. A new liquid insecticide spray is now available to the military forces which obviates the necessity for barbering and which destroys both nits and adults of lice. This liquid is sprayed on pubescent areas of the body and allowed to dry after the individual has showered and dried.

Section IV. The technical appendix embodies laboratory methods and procedures for the collection, preparation and identification of protozoa, helminths and arthropods. The two new features of this section will undoubtedly be of value to the physician: (1) Table 11 on diagnostic criteria of important parasitic disease of man; (2) Table 12 on recommended treatment of important parasitic diseases of man.

Section V. The literature lists on clinical parasitology have been enlarged to include references to most of the more important recent papers. The reviewer has, on occasion, found it disconcerting to find a citation in the text which had been omitted in the lists of references.

The third edition of Clinical Parasitology is relatively free from typographical errors. Errors were notes on the following pages: 7, 41, 51, 438, 502.

The book is attractively printed and bound. There is judicious use of bold face type. The text is well written and presented in a clear, strong and logical manner.

As a basic reference work for beginning students and practicing physicians, and as a comprehensive handbook for sanitarians and physicians both civilian and those engaged in protecting the health of our Armed Forces, this third edition of Craig and Faust's Clinical Parasitology is recommended without reservation.

DAVID RICHARD LINCICOME, PH. D.

Housekeeping Service for Chronic Patients: An Analysis of a Service for the Chronically Sick and the Infirm Aged Operated by the Works Projects Administration: By Marta Fraenkel, M. D. Published by The Welfare Council of New York City, 1942.

The study reported by Dr. Fraenkel in this book was undertaken by The Research Bureau of the Welfare Council of New York City at the request of the Advisory Committee of the Housekeeping Service for Chronic Patients. This service which is defined as: "the use of housekeeping aids in the home care of chronic patients without expense to the patient", was initiated in October, 1935, as a W. P. A. Project. At the end of five years of activity, a survey of the project was thought advisable to: (1) Provide information which would be required in making future decisions in regard to establishing the service on a permanent large scale basis; and (2) suggest needed modifications in the service as then operated. A nine months' period, October 1, 1939, to June 30, 1940, is described, with comprehensive statistical data, analysis, and interpretation, as to the patients served and organization and administration of the project. Summary and conclusions, as well as other parts of the study, although related to a specific project, are of general medico-social interest and value in these days of tremendous increase in magnitude and complexities of the field of geriatrics.

NIRNA E. MEAD.

Charles Aloysius Luzenberg, 1805-1848: A History of Medicine in New Orleans during the years 1830 to 1848: By A. E. Fossier. Reprinted from

the Louisiana Historical Quarterly, Vol. 26, pp. 91, (January) 1943.

Dr. Charles A. Luzenberg, a graduate of Jefferson Medical College, came to New Orleans in 1828 as House Surgeon of Charity Hospital. He married an affluent widow in 1832 and went to Europe to continue his medical education. In 1834 he returned to New Orleans and immediately projected himself into the social, professional and political life of the metropolis. Dr. Luzenberg became associated with many scientific, cultural and political activities. He built and managed a very successful hospital (Franklin Infirmary), was one of the leading spirits in founding in 1834 the Medical College of Louisiana—now Tulane School of Medicine; though only for a very brief period, he was the school's first Professor of Anatomy and Surgery and its second Dean. He was an administrator of Charity Hospital, a member of the Medical Board of Censors, president and founder of the Society of Natural History and the Sciences, president of the Philharmonic Society, Alderman of the first municipality, director of the New Orleans Drainage Company, and more. As a surgeon and physician he was skillful and brilliant. However, his love of publicity caused him to tolerate newspaper reports of some of the more spectacular feats on his scalpel. This breach of medical ethics the Physico-Medical Society of New Orleans could not countenance. An especially lurid newspaper story of an operation on the eye of Seminole Mary precipitated the expulsion of Dr. Luzenberg from the Physico-Medical Society. The event was marked and followed by many public notices, charges and recriminations. The scandal, aired with abandon and gusto, involved many distinguished physicians.

Dr. Fossier's account of Luzenberg's stormy career is a dispassionate one, and the life story represents a somber yet interesting phase of the medical history of New Orleans.

CHARLES MIDLO, M. D.

The Sight Saver: By C. J. Gerling. New York, Harvest House, 1943. Pp. 202. Price, $2.00.

The purposes of this interesting volume are: (1) To inform the public and the medical profession about the simpler problems involved in sight conservation; (2) to debunk some of the many current eye rackets. These cost the American public millions of dollars and no small amount of permament sight loss yearly.

Under the caption, "Beautifying the Eyes," the author discusses in a clear and conservative manner the effects of mascara, eye lash dyes and growers, as well as the merits of ophthalmic hygiene intelligently used.

Eye exercises are discussed at some length, and are correctly classified as useful and useless. The former, called "orthoptic training," are designed better to coordinate the functions of the extra-ocular muscles and vision. They are employed by opthalmologists when of sufficient value to justify the expense of time and money involved. Eye exercises used under the pretext of curing organic diseases of the eyes or permanently correcting optical defects are properly classed as useless, and are fundamentally harmful. All of these exercises are basically designed especially for the more suggestible or neurotic, and they all more or less cleverly attempt: (1) To overcome fear of not being able to see, (2) to increase the urge to see better momentarily; (3) to develop visual memory. Honestly used, they can at least temporarily be of some help to some patients. Unfortunately, they have usually been misused, and infer curative action in incurable conditions. They have become a racket which milks the more neurotic eye patients of their dollars without giving them anything in return except possibly a few psychic highballs.

All physicians will profit by reading this concisely written book of some two hundred pages.

CHARLES A. BAHN, M. D.

Managing Your Mind: You Can Change Human Nature; By S. H. Kraines M. D., and E. S. Thetford. New York, The Macmillan Co., 1943. Pp. 374. Price, $2.75.

The ideas, exposed in this ambitious book, endeavor to explain to what extent man can control and direct his actions, thoughts and feelings. When there is no proper outlet, for emotions which have been stimulated and for physical responses which have been aroused, a state of tension is created and this often presents itself in physical symptoms. The fact that there is no physical basis for many manifestations of illness does not make them less real or less disturbing but it does mean that you cannot expect your physician to cure you unless you change from within. And only when the causes of mental illness are elicited and properly and adequately dealt with can you hope for permanent relief.

An important thesis set forth is that man is a total organism, his physical and his psychological conditions being only different aspects of the one totality. Dr. Kraines is unusually well qualified to discuss the topics presented in this volume.

The chapters on Emotional Thinking, Tension, Symbolic Symptoms, Sex and Marriage are especially good. In section eighteen, Changing Social Nature, the reader is told that standing in the way of the development of objective emotional stability, for society as for the self, are two obstacles: external threats and internal attitudes. The external threats are the hardships that threaten man's existence; lack of food and other essentials and war which intensifies physical problems and adds the danger of sudden destruction. The second set of obstacles includes the attitudes of men and nations. Probably no other social attitudes are more far reaching, in their detrimental effects, than are lust

for power; lack of formulated and planned idealism; vacillation in action; sadistic (fear induced) treatment of minority groups; and passive acceptance or savage condoning of evils existing within the social organism. Here also, one reads that children need to be taught principles and technics of thinking and of emotional control.

When I become discouraged, over the plight of the human race and the enormous social forces involved in attempts to change human nature, I have doubts that it can be done and that efforts in this direction will prove wholly inconsequential. My first thoughts and desires were to differ with some of the authors' statements and to offer criticism. My only regret is that I had to read the book in order to review it. It would be much easier to disagree with Doctor Kraines if I had not read it. However, I am certain that this treatise is an important contribution to the study and understanding of the mind.

C. P. MAY, M. D.

History of Surgery: By Richard A. Leonardo, M. D., Ch. M., F. I. C. S. New York, Froben Press, 1943. Pp. 504. p. Price, $7.50.

"The First History of Surgery in the English Language" is the phrase printed upon the blue jacket of this 504-page volume. Fresh from the Froben Press, this history relates the story of surgery from the Noelithic to the Modern Age, comprising 33 chapters, 100 full-page illustrations, 58 pages of finely-typed bibliography, and 36 pages of addenda.

The subject, surgery, has long attracted medical writers, as this present volume's bibliography indicates. However, with the exception of John Shaw Billings' noted monograph, "The history and literature of surgery", published in 1895 in Dennis' System of Surgery, Dr. Leonardo states that "no large scale history of surgery has appeared in English." His labor therefore has resulted in a valuable and ready reference, one that the author tells us will be companioned by a volume, now being prepared, that will narrate "in a strict, dictionary arrangement" the lives of outstanding surgeons of the ancient and modern worlds. For this reason, the present work contains no portraits.

To be commended is the book's excellent format, pleasing typography, chapter sequence, divisions and subdivisions, capitalization of names with birth and death dates, well-selected quotations, a concise and simple style of expression with a happy elimination of superfluous adjectives and a strict regard for the presentation of facts and many of them. The 100 plates grouped at the end of the book are fine reproductions of title pages and anthologies and first editions, many of the fifteenth and sixteenth centuries, and with illustrations of antique surgical procedures and instruments.

Days, months, even years of leisure hours and of devoted labor have gone in the making of this work wherein is reflected the author's own absorption in a subject of unlimited scope and fascination. Evident also is an understanding that the principal value of any history is its practical usefulness to others. The unusually extensive bibliography containing more than 1000 references is in itself a contribution of value. Special emphasis has been made on American Surgery and Military Surgery, as well as surgical specialties, surgical societies, and surgical literature, in addition to the chronology of surgical discoveries and the men who were responsible for them. Undoubtedly such a book is destined for popularity among students, surgeons, and writers. The author, who spent many years at the surgical clinics of Europe, has dedicated his volume to his teachers at the Royal College of Surgery of Edinburgh.

VERA MOREL

Medical Abstract Service: Edited by Warren P. Morrill, M. D. Chicago, Physician's Record Co., 1943.

A new medical abstract service is inaugurated with the issue of July 1943. Abstracts are printed on 4 x 6 inch cards, which bear subject headings for filing. A classified index and filing instructions with printed filing guides are included in the service. A series of abstracts will appear monthly.

MARY LOUISE MARSHALL

PUBLICATIONS RECEIVED

Williams and Wilkins Company, Baltimore: Fractures and Dislocations for Practitioners, by Edwin O. Geckeler, M. D. Microscopic Technique in Biology and Medicine, by E. V. Cowdry. Body Poise, by Walter Truslow, M. D., F. A. C. S. Synopsis of Tropical Medicine, by Sir Philip Manson-Bahr, C. M. G., D. S. O., M. D., F. R. C. P:

J. B. Lippincott Company, Philadelphia: Life is too Short, An Autobiography, by C. Kay-Scott.

Sheridan House, New York: A Hundred Years of Medicine, by C. D. Haagensen and Wyndham E. B. Lloyd.

W. B. Saunders Company, Philadelphia and London: Internal Medicine in General Practice, by Robert Pratt McCombs.

The Blakiston Company, Philadelphia: Finger Prints, Palms and Soles, by Harold Cummins, Ph. D. and Charles Midlo, M. D.

Paul B. Hoeber, Inc., New York and London: Biomicroscopy of the Eye, by M. L. Berliner, M. D., Volume I.

Grune and Stratton, New York: The Nature and Treatment of Mental Disorders, by Dom Thomas Verner Moore, O. S. B., Ph. D., M. D.

Duke University Press, Durham, N. C.: The Compleat Pediatrician, Fourth Edition, by W. C. Davison, M. D., M. A., D. Sc.

Chemical Publishing Company, Brooklyn, N. Y.: The Biochemistry of Malignant Tumors, by Kurt Stern, M. D. and Robert Willheim, M. D.